ELECTRICAL WEST

March 1953
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U.S.

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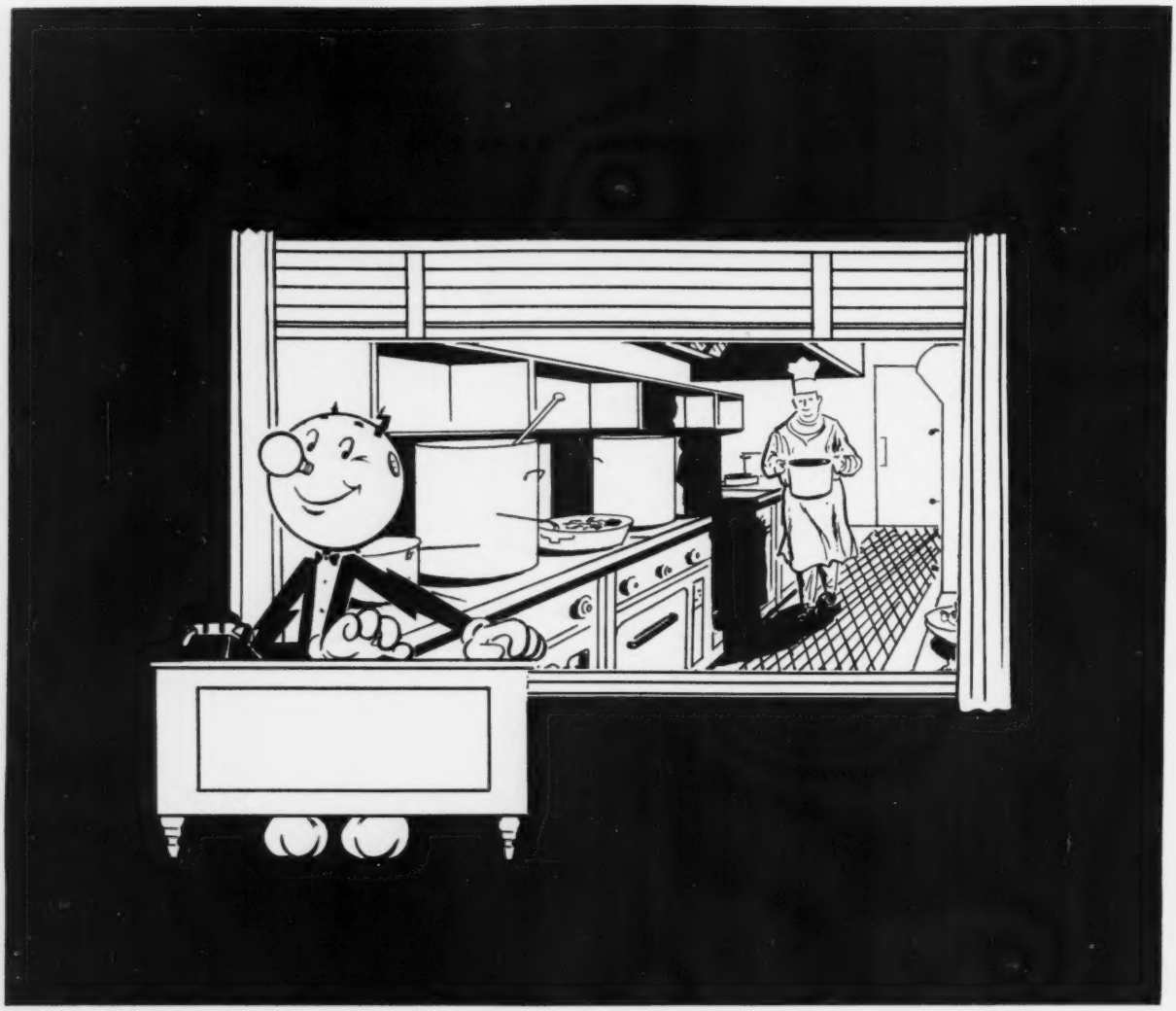


Southern Californians "dine out" more frequently than do families in other sections of the country. One thing which encourages it is the favorable year-around climate. Another, a wealth of fine eating places, ranging from roadside stands to some of the world's finest and most famous restaurants.

Electricity has had much to do with the success of many of these eating places—large and small. More and more each year, the swing is to electric commercial cooking equipment. Electricity's accuracy, versatility and dependability gives any size restaurant efficiency and economy to please the operator, tastier food and faster service to please the customers.

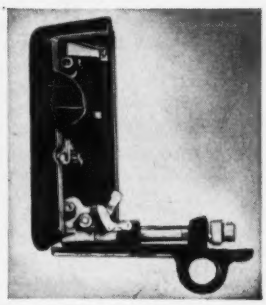
Edison advisory services are available without charge for farming, business and industry in Edison territory.

SOUTHERN CALIFORNIA EDISON COMPANY

Four cutouts in one

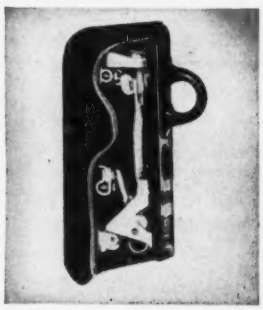
by simply changing doors

Indicating



Drop-out

Reclosing



Disconnect

A G-E FEATURE SINCE 1937! By stocking only three interchangeable doors which fit both 5.2- and 7.8-kv, 50-ampere housings, you get the 4 operating functions illustrated at the left. Available also in 100-ampere ratings, this unique flexibility reduces inventory and simplifies stocks.

INDICATING OR DROPOUT WITH A TWIST OF THE WRIST! A small wire yoke, easily inserted or removed, determines whether the fuseholder door "kicks out" at the bottom for visual indication, or drops open—either way giving positive evidence of a blown fuse.

RECLOSING DOOR AVOIDS UNNECESSARY SERVICE TRIP! The two-element reclosing door restores service within one second after a temporary fault blows the first fuse link. By saving a service trip, the two-shot cutout pays for itself the first time it operates!

FLEXIBLE DISCONNECT BLADE CAN'T GET LOST! It's fastened to the door—can't be misplaced. This disconnect blade doubles the continuous current rating of the cutout. When the blade is disconnected and the door closed, the flexible cable extends downward to indicate that the circuit is open.

WHAT'S MORE THE CUTOUT IS LIBERALLY DESIGNED—has high dielectric strength, uses silver-plated contacts, provides full-range interruption of fault currents, and is conservatively rated. All live parts are completely enclosed for maximum safety.

For complete information contact your G-E Apparatus sales representative, or write for Bulletin GEA-3448. General Electric Company, Schenectady 5, N. Y.

406-44

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

MARCH 1953

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-fifth year of publication

VOL. 110 NO. 3

ELECTRICAL WEST

George C. Tenney, Editor
W. A. Cyr, Associate Editor — Walter C. Heston, Engineering Editor
Peggy Boyer, Associate Editor — John Coatz, Typography

Directory Issue

Five especially interesting articles are scheduled for the April issue. In the lead article Dr. Lester Reukema of the University of California, well versed in nuclear physics, will discuss world energy supply and speculate on methods and economy of ways in which uranium supply may be increased. It is a fitting sequel to the January piece on atomic power plants.

Experience with the use of aluminum conductor on distribution lines is a subject in which every utility in the West is interested. Over in Phoenix they are using field-spun aluminum cable for secondaries. This is a tremendously important development.

We shall have another of Bob Miller's excellent pieces on the ABC's of some phase of utility communications—this time on telephone line carrier. It will take some of the mystery out of carrier applications.

Another timely article will be on above-ground-line treatment of standing poles. A Northwest utility is doing some of this work.

And there will be a description of the large Kaplan turbines at the McNary Dam power plant.

Part II of the April issue will contain the annual directory of manufacturers and representatives, where-to-buy in the West, and directory of appliance service and repair parts.

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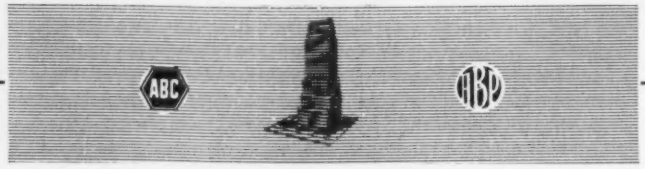

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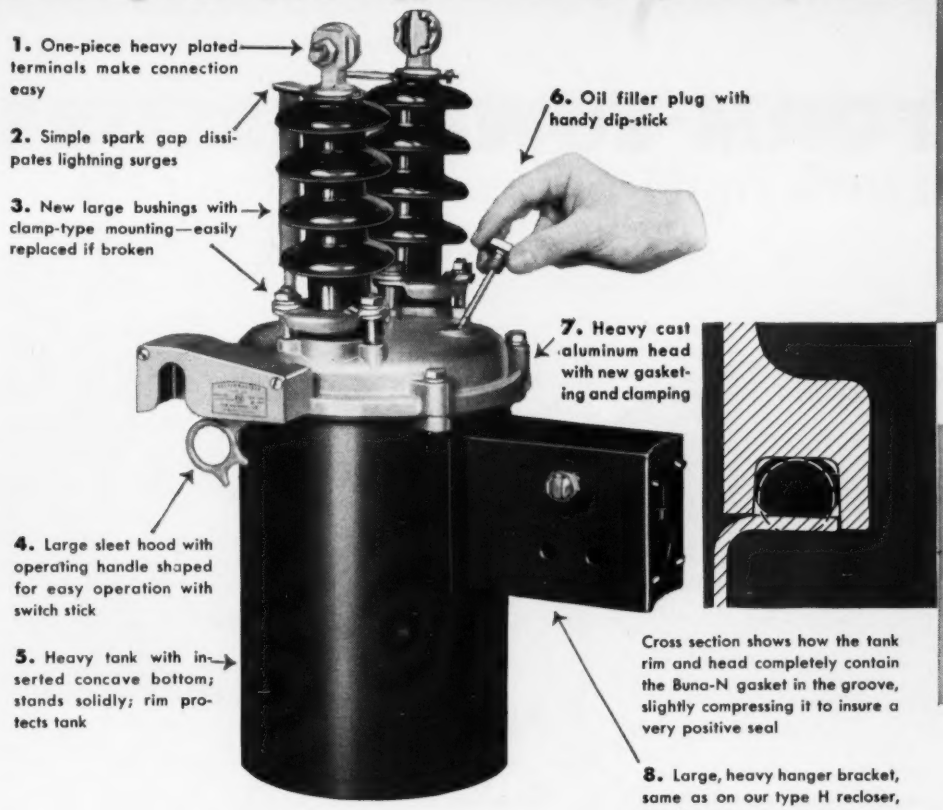
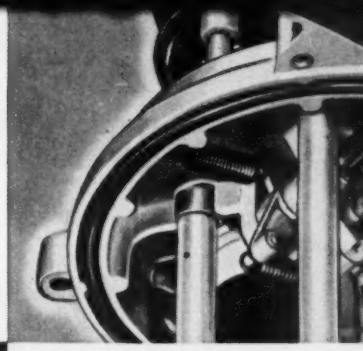
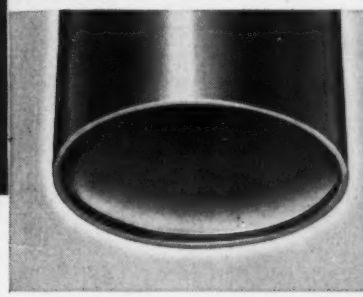

1. One-piece heavy plated terminals make connection easy
2. Simple spark gap dissipates lightning surges
3. New large bushings with clamp-type mounting—easily replaced if broken
4. Large sleet hood with operating handle shaped for easy operation with switch stick
5. Heavy tank with inserted concave bottom; stands solidly; rim protects tank
6. Oil filler plug with handy dip-stick
7. Heavy cast aluminum head with new gasketing and clamping
8. Large, heavy hanger bracket, same as on our type H recloser, for direct pole mounting



Underside of head shows groove for gasket with lugs to retain gasket when head and mechanism are raised.



Cross section shows how the tank rim and head completely contain the Buna-N gasket in the groove, slightly compressing it to insure a very positive seal

Bottom view of tank showing inserted bottom and heavy edge that assures stability on the ground and protects tank bottom against scratches.

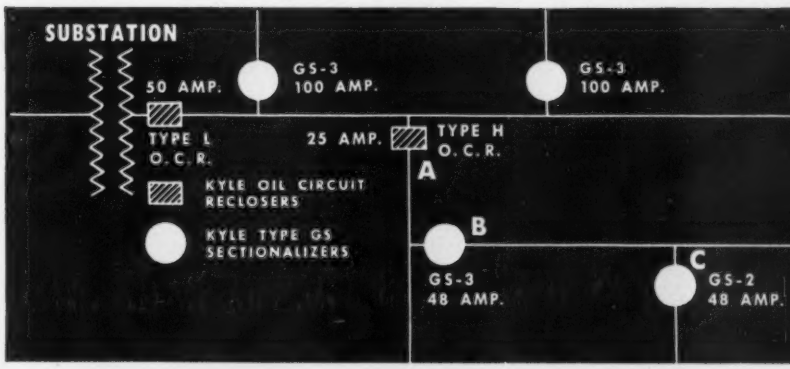
L-M's $47 Kyle® Type GS Sectionalizer Completes Your Automatic Protection

The Kyle Type GS Sectionalizer provides a means of automatically isolating faults on branch lines of a distribution system on which automatic reclosers are used.

Recent improvements illustrated above make the Sectionalizer more convenient to install and operate.

The Kyle Sectionalizer does not interrupt fault currents, but is set to open on a permanent fault, during the time that the recloser is open. It may be set to operate after the first, second, or third operation of the recloser, thus isolating the branch and permitting the recloser to reclose. Thus service is maintained on all but the branch with the fault.

By completing the chain of automatic protection, the Sectionalizer reduces service calls and eliminates fuse replacement; it eliminates the possibility of upsetting coordination by installing the wrong fuse; it provides greater safety when used as a disconnect, and when the line is re-energized after a fault has been corrected. And the low $47 price makes it an outstanding value.



Completely Automatic from Substation to Branch

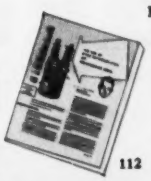
In the diagram, A is the recloser. B is a Kyle Sectionalizer set to open during the *third* operation of the recloser (indicated by GS-3). C is set to open after the *second* operation of the recloser. If a fault occurs beyond C, recloser A operates. If the fault doesn't clear on the first operation, the recloser opens again, and Sectionalizer C opens, isolating the tap. Then the recloser re-energizes the rest of the branch.

If a fault occurs *between* B and C, Sectionalizer C does not operate. But if the fault has not cleared by the third operation of the recloser, Sectionalizer B opens, isolating that branch. The recloser then re-energizes the rest of the line.

Other branches are also protected by Kyle Sectionalizers which are opened by the 50-amp type L recloser at the substation.

Get This New Bulletin

"Use of Kyle Sectionalizers on Distribution Lines" is a brief, clear presentation of the application and operation of Kyle Sectionalizers. Ask your L-M Field Engineer for a copy, or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Div.).



112

LINE MATERIAL
Kyle® Sectionalizers

UNIFORM LOW-PRESSURE,

That little bear has nothing to worry about. Powerful as his Mother is, those huge paws hold the small cub firmly, but with no dangerous pressure. He is fully protected from all natural dangers.

Neither will you have to worry about your conductors if Preformed Armor Rods* are used for (1) Repair Armor (2) Splices (3) Dead-Ends (4) Hot-splice Shunts and (5) SUPPORT ARMOR UNDER SUSPENSION CLAMPS, STOCK-BRIDGE DAMPER CLAMPS; HOT-LINE TAPS, SPLIT-BOLT CONNECTORS OR ANY OTHER CLAMPING DEVICE.

Preformed Armor Rods eliminate any possibility of concentrated high pressures that may cause cold flow of soft conductor metals. There can be no "locking or freezing" of conductor strands under the free ends of Preformed Armor Rods. Your conductor is efficiently protected against vibration fatigue; chafing, abrasion, arcing, slippage and LOOSENING of hardware accessories.

Preformed Armor Rods are the only means of obtaining the UNIFORM LOW-PRESSURE LARGE-AREA CONTACTS that are proving so important in lengthening the life of conductors, particularly aluminum.

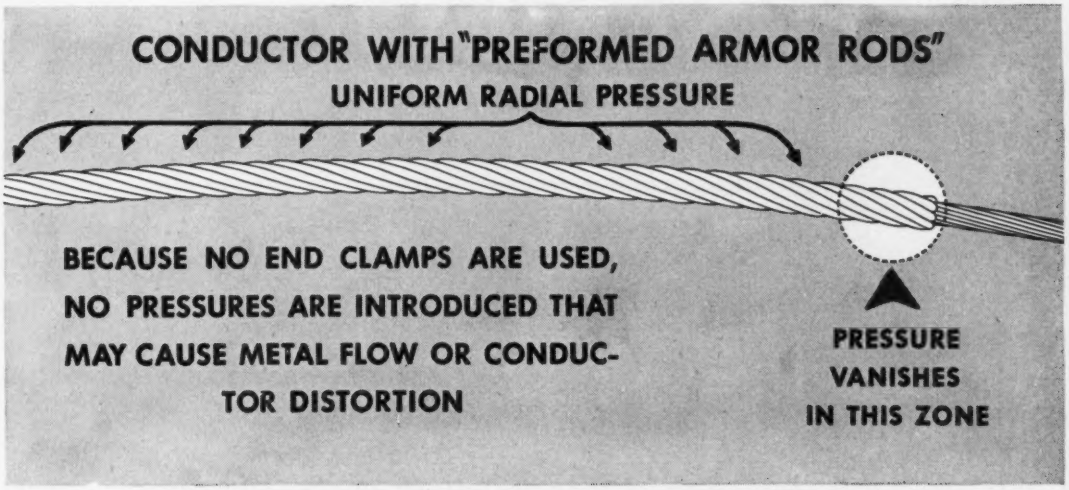
For an up-to-the-minute memorandum on this whole subject by Mr. T. F. Peterson, write Preformed Line Products Co., 5349 St. Clair Ave., Cleveland 3, O.

**Preformed Armor Rods are manufactured under Patent No's 2,275,019 and 2,587,521 . . . other patents pending.*

PLP

PREFORMED

LARGE-AREA CONTACTS
Eliminate Damaging High Pressures


CONDUCTOR WITH "PREFORMED ARMOR RODS"
UNIFORM RADIAL PRESSURE
BECAUSE NO END CLAMPS ARE USED, NO PRESSURES ARE INTRODUCED THAT MAY CAUSE METAL FLOW OR CONDUCTOR DISTORTION
PRESSURE VANISHES IN THIS ZONE

IN ADDITION:

1. **Lower suspension clamp temperatures** are assured because Preformed Armor Rods add extra metal to the conductor within the suspension clamp. The greater electrical conductivity naturally reduces I^2R losses.

2. **Preformed Armor Rods never loosen.** Made of high-strength, spring-quality metals, these rods are elastically sprung onto the conductor. This principle has also been incorporated into PLP Dead-Ends and splices.

3. **Conductor chafing is practically eliminated** because vibration stresses are distributed more evenly. What little abrasion occurs, takes place on the tough armor rods rather than on the soft conductor.

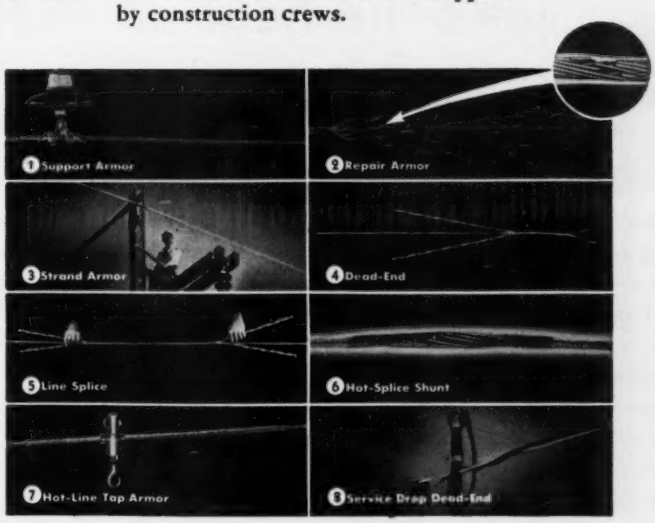
4. **Factory control of** Preformed Armor Rod dimensions guarantee uniformity of field installations. The rods are "factory-fitted" for the particular conductor and cannot be misapplied by construction crews.

There is no question that ALUMINUM CONDUCTORS are here to stay. BUT, connecting and supporting ALUMINUM CONDUCTORS to assure maximum life require new types of clamp supports, splices, dead-ends, tap connections and service-drops.

The efficient and economical answers to these problems . . . not only for Aluminum Conductors, but also for ALL TYPES OF CONDUCTORS . . . are the PLP products shown here.

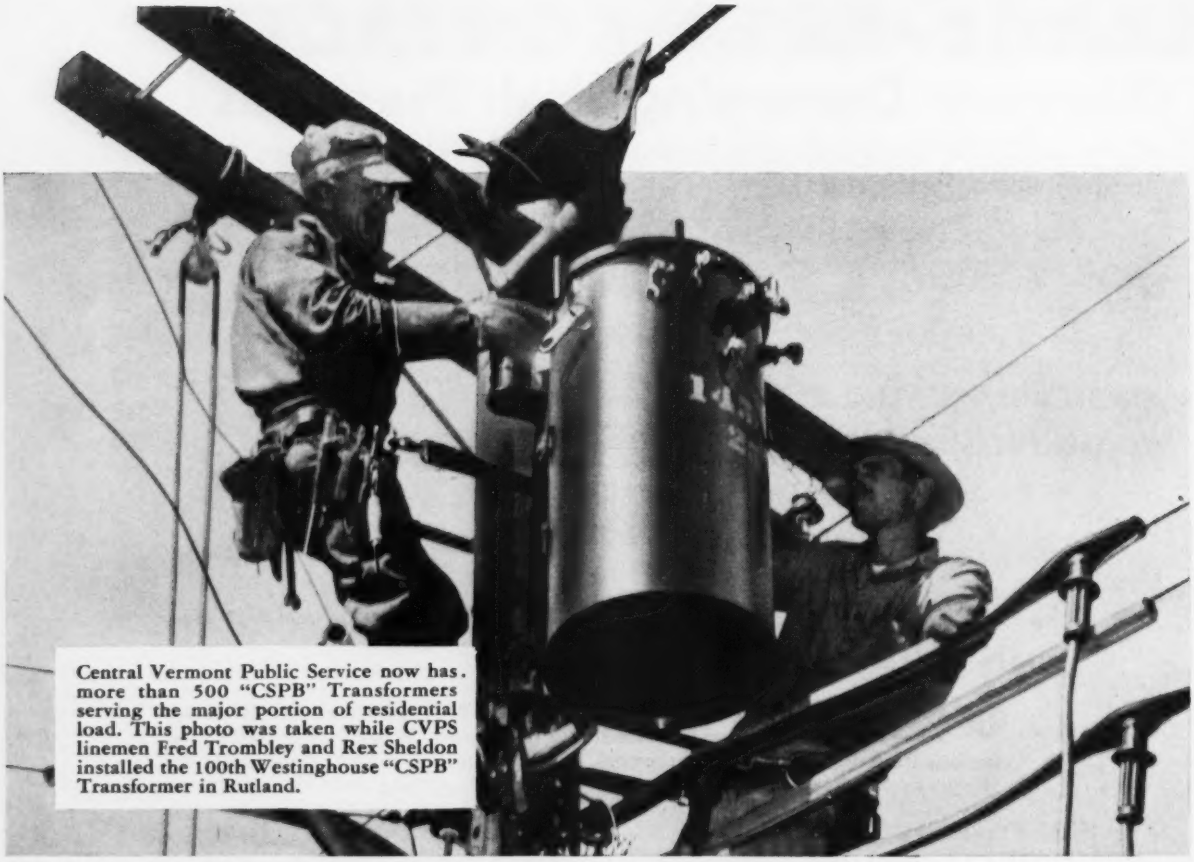
For details of their exclusive advantages, write or . . .

TELEPHONE CLEVELAND: EXpress 1-3571



LINE PRODUCTS CO.

5349 ST. CLAIR AVENUE
CLEVELAND 3, OHIO



Central Vermont Public Service now has more than 500 "CSPB" Transformers serving the major portion of residential load. This photo was taken while CVPS linemen Fred Trombley and Rex Sheldon installed the 100th Westinghouse "CSPB" Transformer in Rutland.

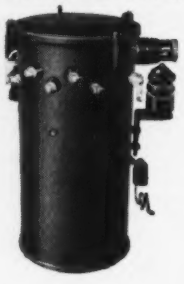
"CSPB®" Transformers take the heat off Rutland's load problem

Heavy loading of radial distribution made it necessary for Central Vermont Public Service to increase capacity at once. Future growth was certain.

They provided immediate capacity by banking with "CSPB" Transformers. Then, by simply changing to higher ratings, or adding more transformers, future growth could be handled economically.

For years, tying secondaries together has been recognized as providing the ultimate in transformer flexibility. But only with "CSPB" Transformers, first introduced by Westinghouse in 1946, can you eliminate the danger that sudden overloads or faults might cascade onto other transformers, and blank out the entire system. Here's why:

Two secondary breakers with warning signals function in each "CSPB" Transformer; one to serve each section of the secondaries. Secondaries are tied together only through the transformer. Therefore, "CSPB" Transformers first provide signal-light indication of a section operating at dangerous overload; then completely isolate severely overloaded or faulted sections...if that should become necessary to maintain service on the balance of the system.



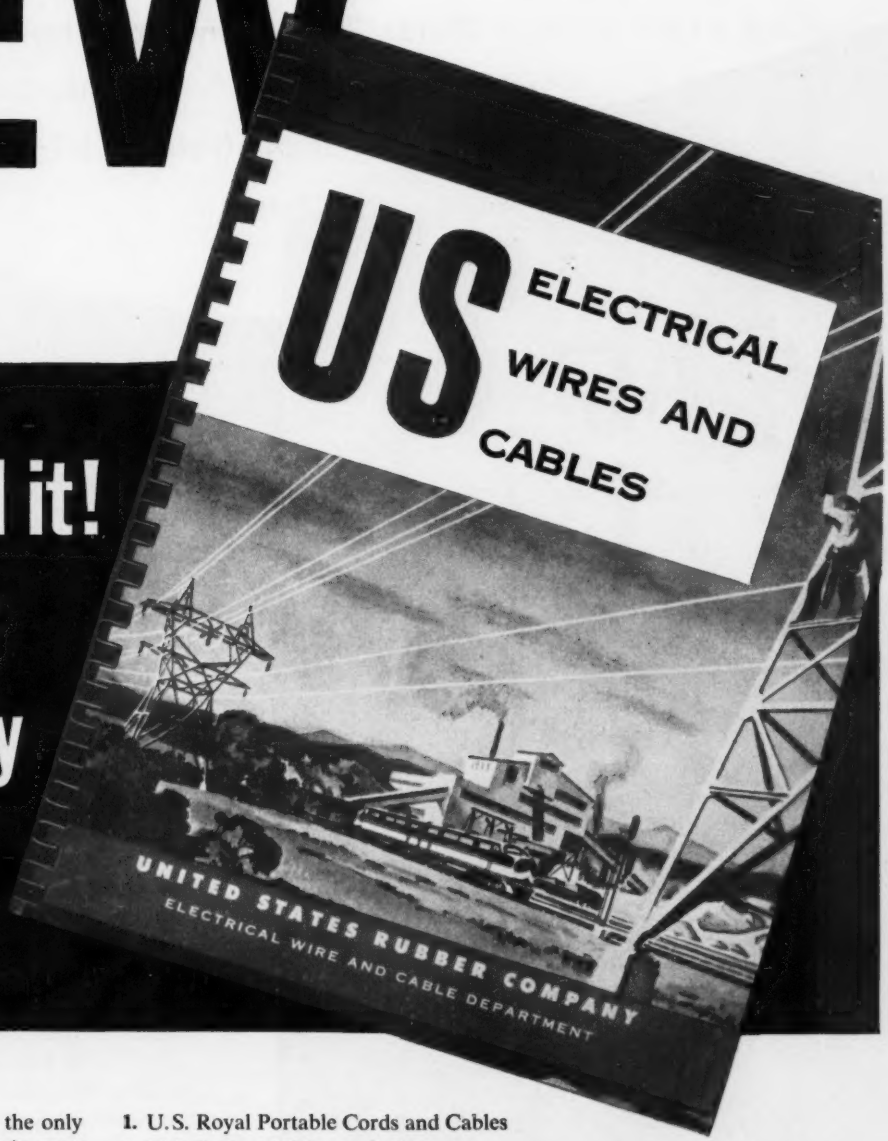
Ask your Westinghouse representative for complete information, or write direct for Booklet B-4310A. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-70660-A

YOU CAN BE SURE...IF IT'S Westinghouse

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

NEW



You need it! Send for free copy today!

United States Rubber Company, the only electrical wire and cable producer to grow its own natural rubber and to manufacture its own plastics and synthetic rubber, makes a complete line of electrical wires and cables for every industrial and domestic application. Just published is the 1953 "U.S." Catalog, essential for men who specify, install or maintain electrical wire and cable. Send for your free copy to address below. Here are the catalog chapter headings:

1. U.S. Royal Portable Cords and Cables
2. U.S. Railroad Wires and Cables
3. U.S. Power Cables
4. U.S. Control and Signal Cables
5. U.S. Building Wires and Cables
6. U.S. Bare and Weatherproof Wires
7. U.S. Flexible Cords and Cord Sets
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10. Technical Data

"U.S." Research perfects it...
"U.S." Production builds it

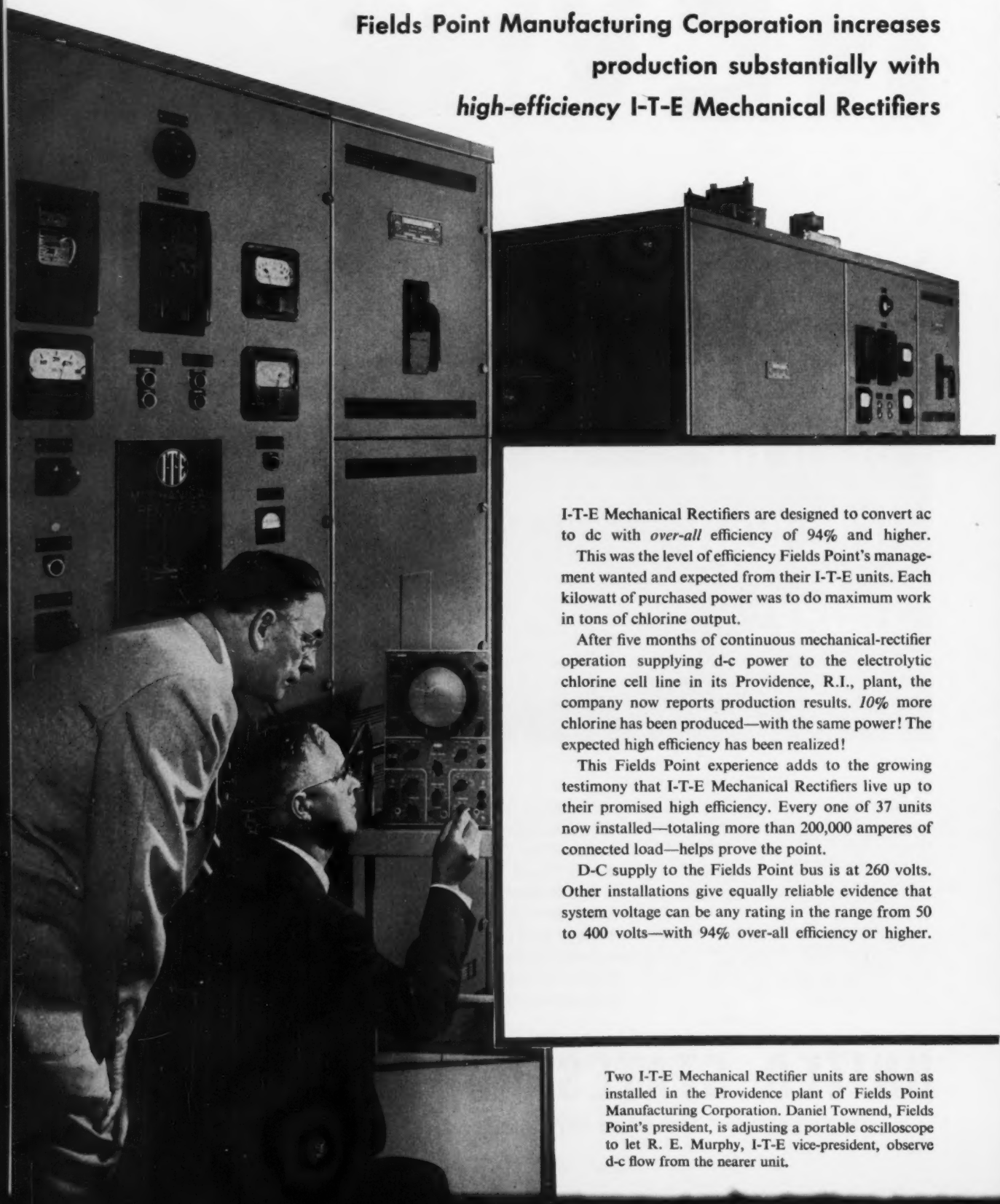
U.S. RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

ELECTRICAL WIRE AND CABLE DEPARTMENT • Rockefeller Center, New York 20, N. Y.

The same incoming power

Fields Point Manufacturing Corporation increases production substantially with *high-efficiency* I-T-E Mechanical Rectifiers



I-T-E Mechanical Rectifiers are designed to convert ac to dc with *over-all* efficiency of 94% and higher.

This was the level of efficiency Fields Point's management wanted and expected from their I-T-E units. Each kilowatt of purchased power was to do maximum work in tons of chlorine output.

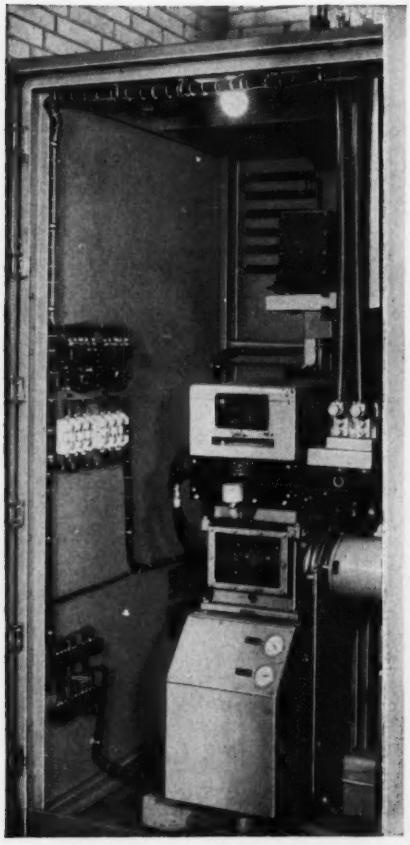
After five months of continuous mechanical-rectifier operation supplying d-c power to the electrolytic chlorine cell line in its Providence, R.I., plant, the company now reports production results. *10%* more chlorine has been produced—with the same power! The expected high efficiency has been realized!

This Fields Point experience adds to the growing testimony that I-T-E Mechanical Rectifiers live up to their promised high efficiency. Every one of 37 units now installed—totaling more than 200,000 amperes of connected load—helps prove the point.

D-C supply to the Fields Point bus is at 260 volts. Other installations give equally reliable evidence that system voltage can be any rating in the range from 50 to 400 volts—with 94% over-all efficiency or higher.

Two I-T-E Mechanical Rectifier units are shown as installed in the Providence plant of Fields Point Manufacturing Corporation. Daniel Townend, Fields Point's president, is adjusting a portable oscilloscope to let R. E. Murphy, I-T-E vice-president, observe d-c flow from the nearer unit.

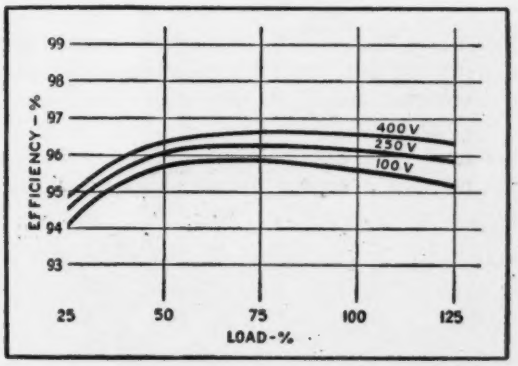
but 10% more chlorine!



One of the two contact mechanisms in the Fields Point installation of I-T-E Mechanical Rectifiers. Each Rectifier is a standard I-T-E unit with design rating of 5000 d-c amperes.

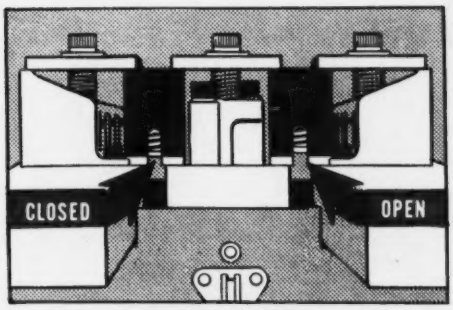
HIGH EFFICIENCY THROUGHOUT LOAD RANGE

During continuous operation at the Fields Point plant, load has remained at or very near 100%. Should load vary at any time to as low as 25% or up to 125%, over-all conversion efficiency will still be high. The EFFICIENCY curve below is characteristic of I-T-E Mechanical Rectifier performance, and represents a principal advantage: flexibility for plant production schedules while getting the most out of a-c power purchased.



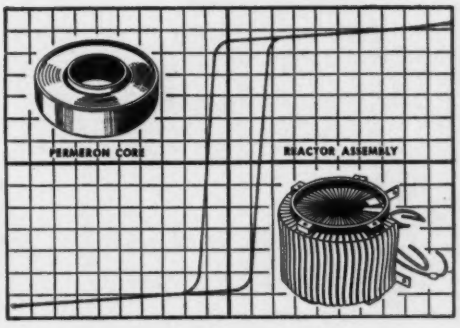
HERE'S WHY

Here are two basic reasons why I-T-E Mechanical Rectifier users get 94 kw (and more) of d-c power for every 100 kw of a-c power they buy:



Solid silver contacts held closed by powerful springs, give highest conductivity between a-c and d-c networks.

Sparkless low-loss commutation is obtained by interposing a Permeron*-core reactor between a-c supply and contact mechanism. This provides a brief period during which current in a contact is zero, allowing sufficient time for sparkless contact closing or opening.



**I-T-E's special saturable core material. Typical Permeron magnetization curve is shown above.*

Get the facts—If you are planning new or expanded a-c to d-c conversion facilities, it will pay you to investigate high-efficiency I-T-E Mechanical Rectifiers. They increase production or cut power bills in many kinds of applications—electrolytic chemical production, metal refining, motor load. Write for details.

BULLETIN 5106—covers theory, design, construction, standard arrangements.

BULLETIN 5204—gives details of I-T-E's special magnetic core material, *Permeron*.

BULLETIN 5205—presents engineering explanation of high efficiency provided by I-T-E Mechanical Rectifiers.

I-T-E

MECHANICAL RECTIFIERS

I-T-E CIRCUIT BREAKER CO.•Rectifier Division•19th and Hamilton Streets, Philadelphia 30, Pa.

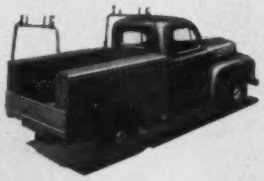
EPD—Canadian Mfg. and Sales: Eastern Power Devices, Ltd. Toronto

Lowers Operating Costs

Steps up crew efficiency!

Powers-American bodies do their job faster, more efficiently, and at lower cost, because they're "*job-engineered.*" Each model incorporates design features *proved* by utilities over many years of operation, and is field-tested under actual working conditions by utility engineers *before* production! "*Job Engineered*" means long life and trouble-free service for you, whatever your utility body needs may be. Look to *Powers-American* as *your 1* source for *all* types of utility bodies and equipment.

HYDRAULIC TOWER
Available in models having ground-to-platform heights of 21', 25', and 30', for installation on chassis having 1½ ton capacity or more.



GENERAL SERVICE BODY
½, ¾, 1, and 1½ ton models. Can be equipped to meet any operating requirement.

FORESTRY BODY
For tree trimming and clearing. Also available with winch and derrick for construction work.

REVOLVING AERIAL LADDER
Can be extended to any length, spotted in forty positions throughout a full 360° revolution, and inclined at any angle from 30° to 75°. Easily operated by one man. Safe enough to support 4 times normal working load. Available in sizes having ground-to-platform heights from 23' 6" to 32' 3".

LIGHT CONSTRUCTION BODY (350)
Fold-over derrick can handle poles up to 40' in length. Underfloor winch leaves loading area clear.

"The Accepted Standard with Utilities Everywhere"

POWERS *American* DIVISION

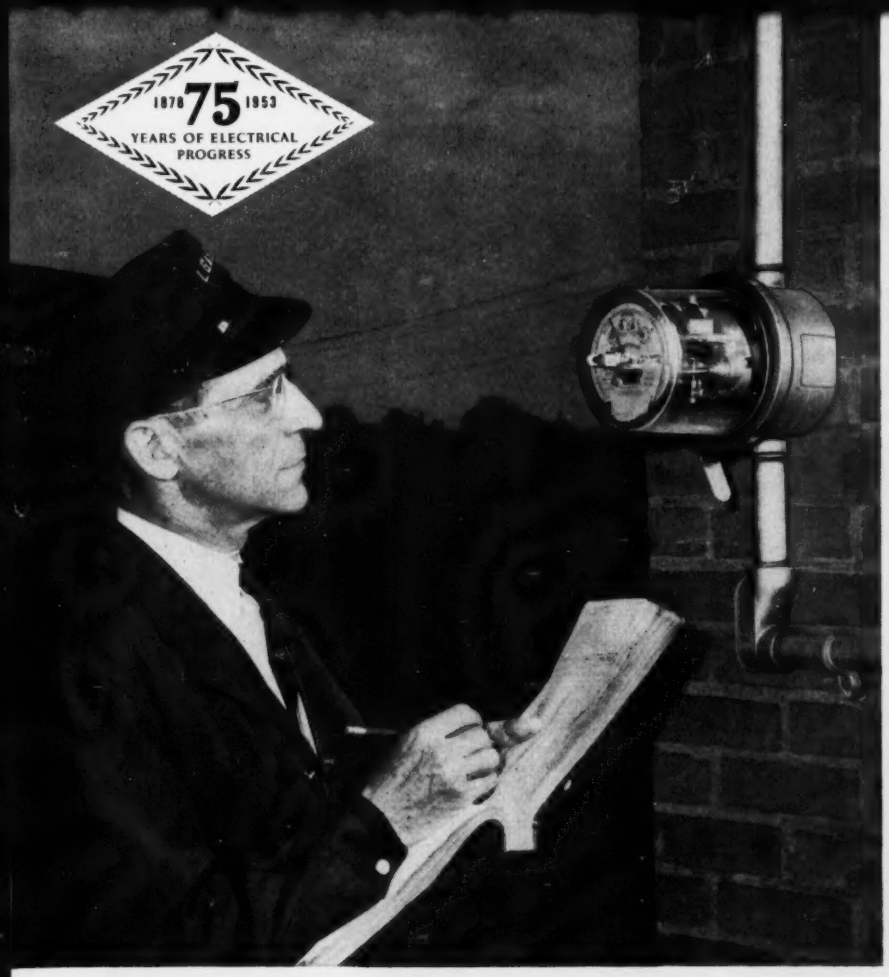
ACB

PUBLIC UTILITY BODIES AND EQUIPMENT

McCABE-POWERS AUTO BODY COMPANY

Latham Square Bldg., Oakland 12, California

There are many styles of *Powers-American* Bodies not shown here. Write for descriptive catalog today.



IM-50 Meters Give Accurate, Low-Cost Demand Measurement

Moderate price and low installation cost make the General Electric IM-50 watthour demand meter the type best suited for measuring demand of small industrial and commercial power users.

The watthour meter is the well-known Type I-50, having such benefits as magnetic suspension (no meter-bearing wear), lightning protection, and sustained calibration—which combine to give accurate and reliable performance with little maintenance. The demand register is a mechanical block-interval type—either indicating (M-30) or cumulative (M-31).

QUICK, EASY RESETTING—The reset mechanism is simple and readily resealed, requires only one hole in the glass cover, and is corrosion-resistant to prevent sticking with rust.

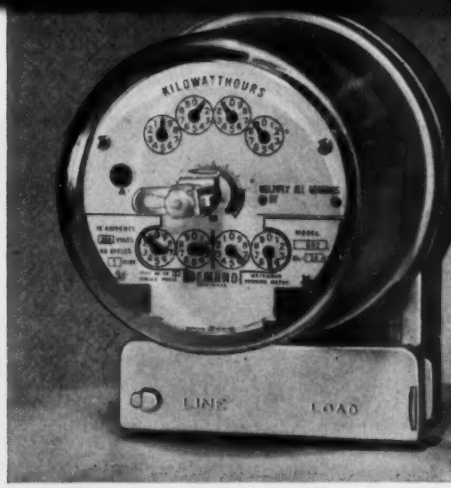
Interval resetting is positive and precise, with no impact upon returning to zero. This minimizes wear and the possible necessity for occasional readjustment.

ADJUSTMENTS MINIMIZED—The register has few adjustments, all accessible and easy to make. Freedom from wear, together with high factors of safety, reduces any subsequent readjustment to the minimum.

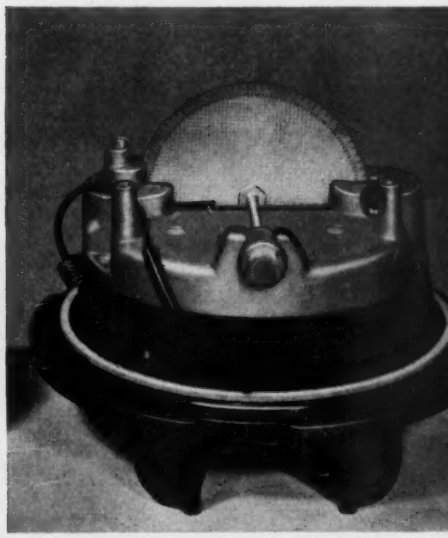
For more information, contact your G-E representative or write Section 601-93, General Electric, Schenectady 5, N. Y.

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

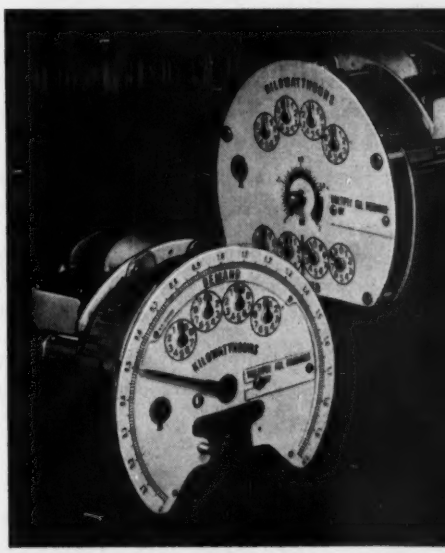
GENERAL ELECTRIC



IM-50 METERS are available for socket (left) or front (above) connections, with variations up to 10% of rated meter voltage permissible.



I-50 FEATURES such as magnetic suspension, die-cast frame, and molded insulation provide sustained accuracy and reliable performance.



INDICATING OR CUMULATIVE REGISTER is used. Either can be purchased separately for use on watthour meters that are now in service.

1 CONDUIT DOES THE WORK OF 2

WITH ROCKBESTOS PNR CONTROL CABLE

Because Rockbestos PNR is approximately ½ the size of competitive control cable, you pull 12 conductor PNR in one conduit where before you had to use two conduits or go to a larger size conduit to carry the same amount of cable.

Result — one conduit carries almost twice the number of conductors. You save steel conduit and fittings . . . and cut installation costs.

Get the complete PNR story, today. Write or ask your nearest Rockbestos representative.

PERMANENTLY INSULATED ROCKBESTOS WIRES AND CABLES

QUICK FACTS ABOUT

PNR

46% smaller area* . . . 28% smaller diameters*. Use smaller conduit and fittings or put more conductors in present conduit.

Dielectric breakdown . . . over 40 times operating voltage.

Lighter and smaller. Easier to handle, store, ship, pull through conduit.

Flexible to — 25°C (–13°F). No cracking!

Rated 600 volts . . . conductor operating temperature 75°C (168°F).

*Average determined by comparison with competitive control cable.

ROCKBESTOS

PRODUCTS CORPORATION
NEW HAVEN 4, CONNECTICUT
NEW YORK • CLEVELAND • DETROIT • CHICAGO
PITTSBURGH • ST. LOUIS • LOS ANGELES
OAKLAND, CALIFORNIA • NEW ORLEANS • SEATTLE

Allis-Chalmers distribution regulator in a Minnesota distribution system.

Now you can solve voltage problems fast. Stocks of Allis-Chalmers power and distribution regulators located at 20 strategic points across the country assure fast, efficient delivery when you have voltage troubles. You can end complaints due to low voltage economically and start profits rising faster than ever before.

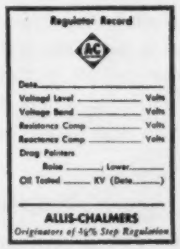
Allis-Chalmers ⅝% step voltage regulators have proved themselves in the twenty years since they were first introduced. They are low in cost. They are accurate and reliable. And now with the new stocking program, they are the fast answer to voltage problems as well.

Get Full Information

Get the full story on Allis-Chalmers power and distribution regulators. Call your nearest Allis-Chalmers district office today or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3933

FREE MAINTENANCE STICKERS PROVIDE HANDY SERVICE RECORD

You get an on-the-spot record of control settings with these handy, adhesive-backed stickers. They go on any type of regulator, giving all the room you need for a complete service record. Write on them in pen or pencil. Call your nearest A-C district office or write Allis-Chalmers, Milwaukee 1, Wisconsin.



ALLIS-CHALMERS

Originators of ⅝% Step Regulation

ENGINEERING NOTES

Operating Men Point Out Additional Savings With New Ground Rod Driver

OUR ADS have already told you that one man using a Kearney Ground Rod Driver can install a rod in less than half the time formerly required by two men using conventional methods. Now, our customers in the field have pointed out additional savings possible with the tool.

First of all, we know that diameter of the ground rod has little to do with the conductivity of the ground. For example, studies prove that a ⅜" rod driven to the same depth as a 1" rod in the same soil has the same grounding efficiency. The only reason engineers specify the larger rod is to get the physical strength necessary to permit sledge-hammer driving to desired depth without buckling. But with the Kearney Driver it is actually easier to drive the smaller rod, and with absolutely no danger of bending. Less dirt to displace ... less resistance to the passage of the rod.

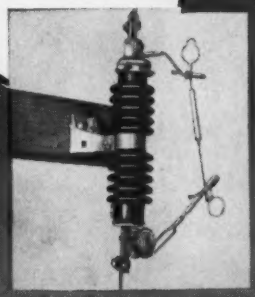
More important, look at the reduced cost. A ⅜" rod costs less than half as much as a ⅝" rod of equivalent length! Multiply this figure by the number of rods you plan to use this year and you quickly see how much saving is involved. Or, turn it around . . . specify a rod twice as long as you've been using, get much better grounds ... with *no* increase in material cost and with *far less* labor cost for driving!

Either way it will pay you to write today to Dept. EE-1 for more information.

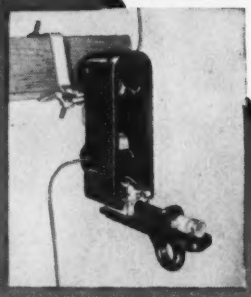
West Coast Distributor

MAYDWELL & HARTZELL
INCORPORATED
LOS ANGELES • SEATTLE
PORTLAND • SAN FRANCISCO
SPOKANE • PHOENIX

Color Identification Eliminates Fuse Link Confusion
Each type of Kearney Fuse Link is packaged in a carton printed with its own separate, distinct color combination. This extra Kearney feature makes identification almost automatic, prevents errors in reading labels.
PULL-TAB FUSE PAK
5 AMP
Reduce
Install
the RIGHT LINK


THE TRIP-O-LINK

THE TRIP OUT


THE TRIP-O-MATIC

Kearney Cutouts and Kearney Fuse Links... *Designed-Matched for Better Performance*

IT IS TRUE that Kearney Fuse Links will work well in any good cutout regardless of make. That's because the fuse link is the center of equipment operation . . . but, only by using Kearney Fuse Links in Kearney Cutouts can you take full advantage of the extreme accuracy and reliability built into Kearney line protection equipment.

Follow the lead of the design engineers who have carefully computed our time-current fuse curves. For accurate, system-wide coordination, specify Kearney Cutouts and Kearney Fuse Links. Complete curves and data on all the Kearney Fuse Links are yours for the asking.

JAMES R. KEARNEY CORPORATION
4224-42 CLAYTON AVE., ST. LOUIS 10, MO.
Canadian Plant—Guelph, Ont.

Always Specify **KEARNEY**

220

YOUR PROTECTION *Cost*

Use KEARNEY FUSE LINKS

LOOK at your records. If you have been dropping loads, losing revenue, damaging equipment needlessly because of faulty fuse links . . . then you know that cheap fuse links are never inexpensive. Low first cost — yes, but unnecessary outages quickly drain away any savings on purchase price. That's why it will pay you to standardize on the industry's standard . . . Kearney Fuse Links.

They cost a little more, but they lead the field because they are a quality product, precision-built for accurate, proved performance. When you specify Kearney Fuse Links you make certain that your system has the lasting, coordinated protection and service continuity that today's load demands.

Fusing the Kearney Trip-O-Link

at the RIGHT PLACE.....

For Prompt Isolation of Troublesome Circuits—While Maintaining Service on Adjacent Lines . . .

TYPE 200

Certain circuits may prove to be more troublesome than others. When a line is subject to damaging long-time overloads and surges, continuity of service in adjacent circuits demands prompt action in isolating the troublesome line. The low temperature operation of this link assures that overloads up to 150% of the fuse rating can be carried for one hour without damage to the fuse or fuse cutout.

For Reducing Outages on Circuits Subject to Switching and Lightning Surges . . .

TYPE KS

Where switching, motor-starting and lightning surges are common, maintain service by using the Type KS Fuse Link. The overload capacities of the Type KS and Type 200 are identical; however, the surge capacity of the Type KS is twice that of the Type 200. The slow speed characteristic of the KS link provides proper coordination with circuit breakers as well as other fuse links.

For Distribution Transformer Overload Protection plus Extra High Surge Capacity . . .

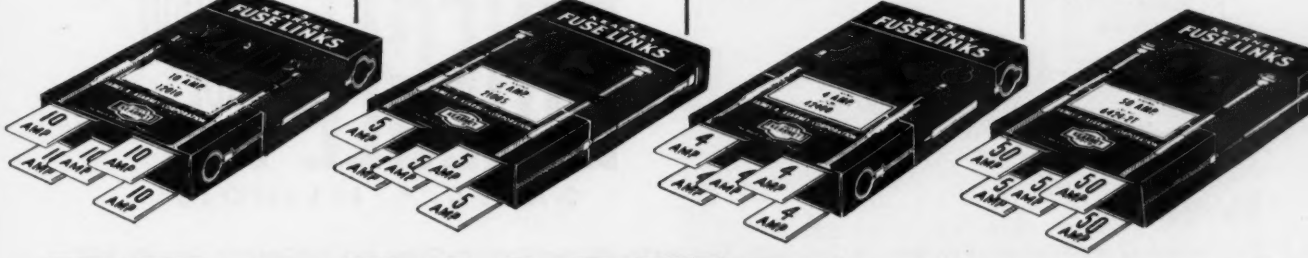
TYPE X

Designed to match the safe loading curves of distribution transformers, the Type X Fuse Link keeps transformers in service during heavy overload periods and surges, and yet fuses in an instant when faults persist. The extra high surge capacity means satisfied customers and lowered expense due to unnecessary outages. The Type X Fuse will open 230% of rated current within 5 minutes.

For Opening 150% of Rated Load Within 5 Minutes . . .

TYPE QA

The QA link is designed open at a lower percentag of rated current and ther fore will fuse more rapid than fuse links of the sam ampere rating which hav been designed to ope 230% of rated load with five minutes. For working o coordination problems i volving all Kearney Fus Links, minimum melting ar total clearing time-curre curves will gladly be sup plied upon request.



PRODUCTS *for Better Constructio — Safer Maintenanc*

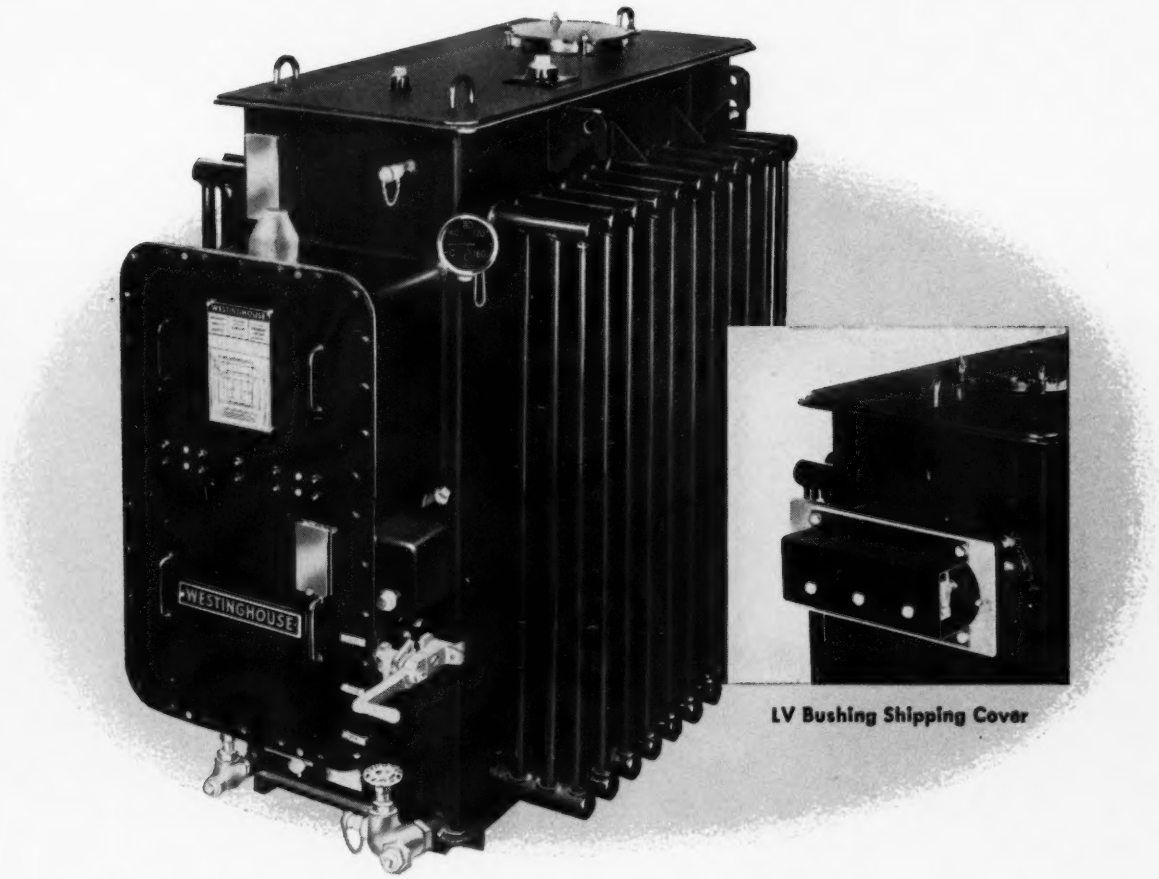
For many years Contractors from Coast to Coast have used Briegel All Steel Indenter Fittings. U. L. approved as concretetight and for general use, B-M Indenter Fittings are faster, easier to use and neater in appearance.

Installation is simple and less expensive. Two quick squeezes sets them forever. Try B-M Indenter Fittings and get more profits from each job!

BRIEGEL METHOD TOOL CO.
GALVA, • ILLINOIS

Distributed by

The M. B. Austin Co., Northbrook, Ill.; Clayton Mark & Co., Evanston, Ill.; Nikoh Tube Co., 5000 South Whipple St., Chicago, Ill.; Clifton Conduit Co., Jersey City, N. J.; The Steelduct Co., Youngstown, Ohio; Columbia Cable & Electric Corp., 255 Chestnut St., Brooklyn, N. Y.; Pittsburgh Standard Conduit Co., Pittsburgh, Penn.; Wagner Malleable Products Co., Decatur, Ill.; J. R. Richards Co., Carnegie, Penn.; Kondu Mfg. Co., Ltd., Preston, Ont.



QUALITY in the transformer ADDS RELIABILITY to the network

Everyone agrees that when you install a network system, you install *the best* for reliability and service continuity.

But the degree of reliability... or, more exactly, the freedom from maintenance, depends directly on quality in the transformers.

That's why Westinghouse Network Transformers have continuously wound coils of sliverless copper, to guard against hot spots, crystallization and pricked or scored insulation. That's why they're high-frequency tested, too.

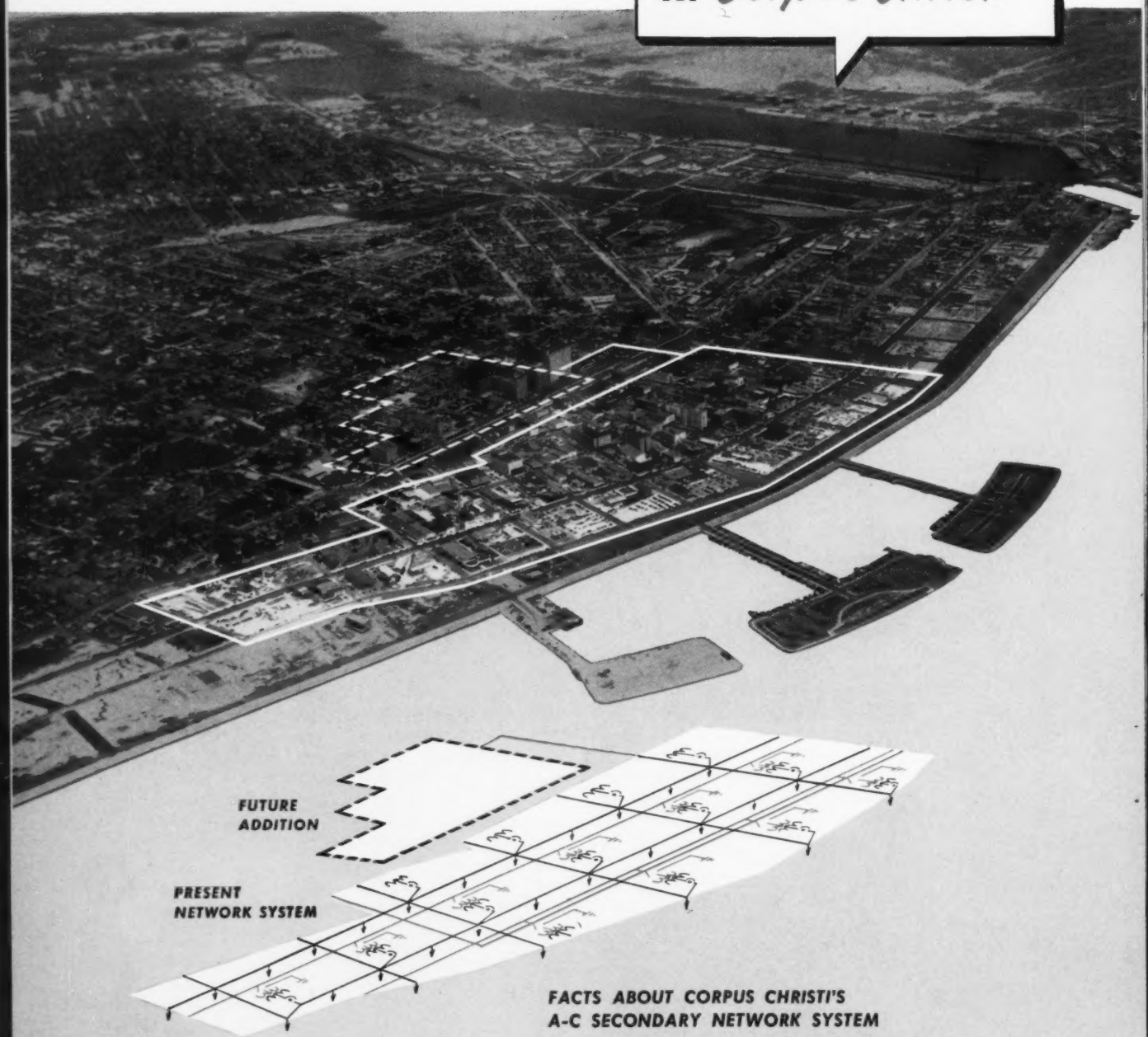
In addition, Westinghouse Transformers are filled under vacuum, and have welded-on covers to assure a perfect seal. Finishes are not only baked for longer life, but bases are undercoated.

There are many other features such as the LV bushing shipping cover, shown above, that assure safe delivery of the quality built into Westinghouse Network Transformers. Your Westinghouse representative will be glad to give you full information, or write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70646

YOU CAN BE SURE... IF IT'S
Westinghouse

NETWORK TRANSFORMERS

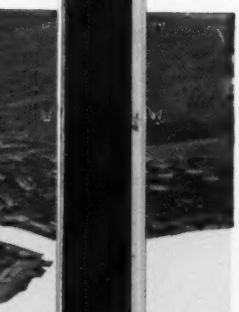
NETWORK SYSTEMS PAY... IN *Corpus Christi*



FACTS ABOUT CORPUS CHRISTI'S A-C SECONDARY NETWORK SYSTEM

The new network encompasses the area roughly below the Bluff from Mann Street to Born Street consisting of 43 blocks, (see large white area). The flexibility of the A-C Secondary Network System will permit the inclusion of 12 more blocks above the Bluff, (see dotted area). Thus far, the underground network system contains thirty-two subway-type network transformers and protectors and vaults.

Converting Growth Problems into Load Profits!



Rapid growth, including the construction of many new buildings and the addition of large loads such as air-conditioning units, brought the downtown overhead electric distribution system in Corpus Christi, Texas, to the practical limits of its expansion three years ago. Because of the unprecedented demand, the existing 2300-volt overhead radial system proved inadequate. There are no alleys in downtown Corpus Christi; streets were cluttered with poles and wires. In some cases, several sets of secondary mains were involved on the same street. Voltage regulation and service continuity problems were acute.

CAREFUL SYSTEM PLANNING by Central Power and Light Company indicated an underground network, supplied by a higher primary voltage, as the desirable long-term solution. In 1949 they embarked on a three-year program, installing a 12,480-volt primary. Four underground feeders were brought in from the Nueces Bay Power Plant to the new, downtown, A-C Secondary Network System. Because of tidewater conditions, this 43-block area presented serious construction and operation problems. The transformers are subway type, 500 kva, 3 phase, with throat-mounted submersible, 1600-ampere, 125/216-volt network protectors.

CENTRAL POWER AND LIGHT COMPANY now is able to provide customers with uninterrupted power supply . . . previous problems and unsightly pole lines have disappeared! The network system has proved as practical and economical as anticipated. In short, Corpus Christi has solved future load-growth problems . . . the utility now is ready to more economically serve its increasing load.

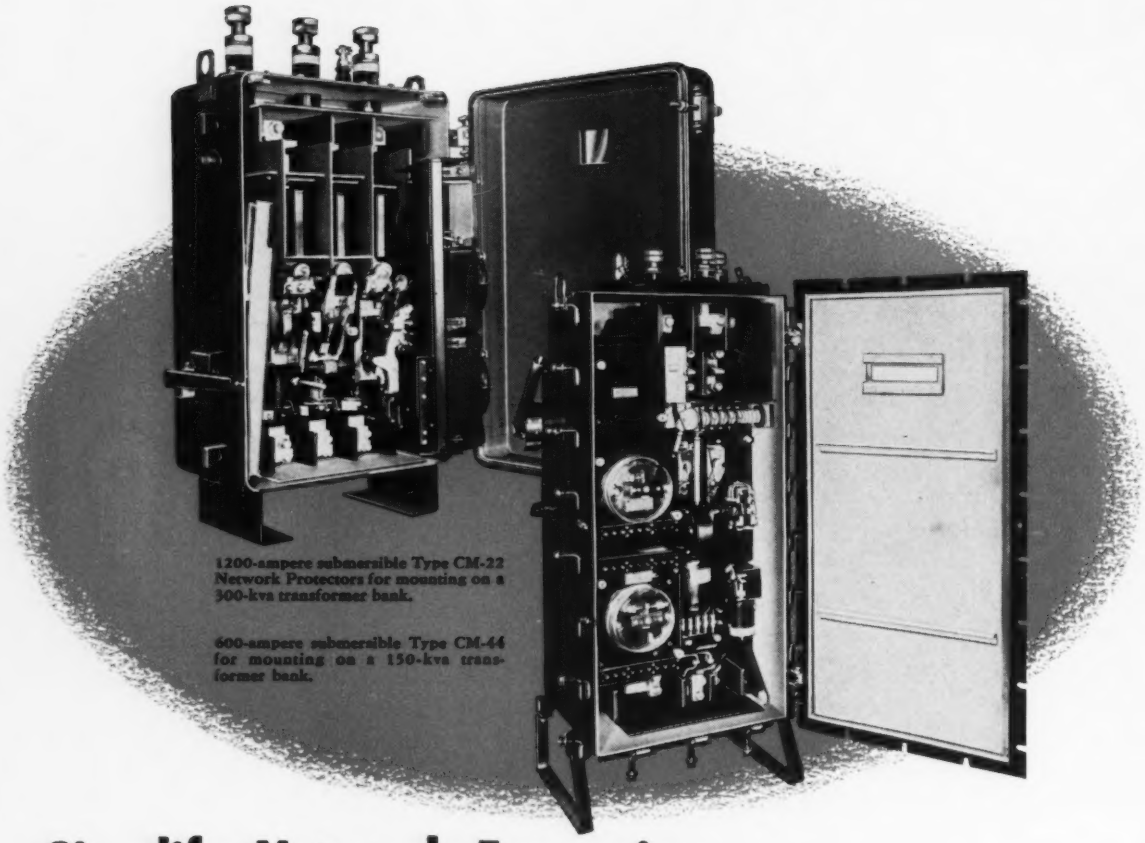
THE RANGE OF WESTINGHOUSE NETWORK EQUIPMENT enables you to employ the type of network system that best suits your future needs. Booklet B-4002, "A-C Secondary Network Systems", contains complete information about the flexibility and many advantages of this system. Our engineers are ready to help you in your network system planning. Call your nearby Westinghouse office, or write: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-97158

YOU CAN BE SURE...IF IT'S

Westinghouse

NETWORK EQUIPMENT



1200-ampere submersible Type CM-22 Network Protectors for mounting on a 300-kva transformer bank.

600-ampere submersible Type CM-44 for mounting on a 150-kva transformer bank.

Simplify Network Expansion with Westinghouse NETWORK PROTECTORS

You can expand your network system simply—and economically—with Westinghouse Network Protectors. The reason—Westinghouse heavy-duty and medium-duty protector use the same relays. Hence, as load grows medium-duty (CM-44) protectors can be replaced with heavy-duty (CM-22) protectors and suitable transformers—*without upsetting system co-ordination!* CM-44 units may then be moved to lighter load areas.

Keep this important Westinghouse feature in mind as YOU plan your network system. It's a *sure* way to provide for simple, low-cost expansion of that system when load conditions dictate.

Ask your Westinghouse representative for further information . . . or write Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa. J-60778

ONLY WESTINGHOUSE NETWORK RELAYS . . .

- Eliminate gears that cause friction and wear.
- Have a sensitive reverse-current setting that can be varied from .1% to 10% of the network protector rating.
- Have bearing surfaces readily accessible for inspection and cleaning.
- Have relay terminal screws that eliminate the need for additional testing facilities in the control wiring.
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YOU CAN BE SURE . . . IF IT'S

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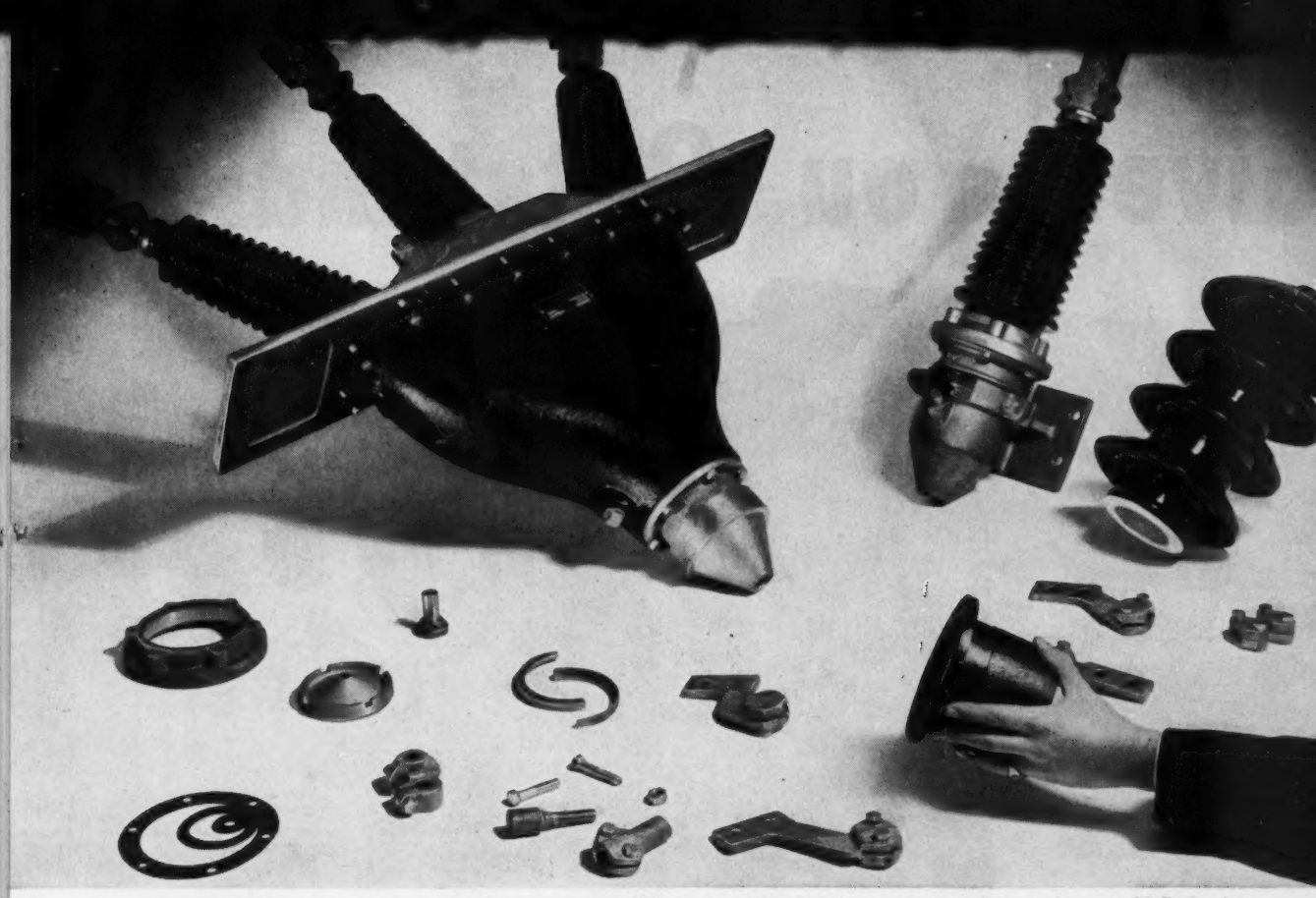
IN Corpus Christi



Lugs, insulators, bell shapes, and cable entrances are all interchangeable. This is an important feature of AnacondA Potheads.

ANACONDA POTHEADS

This complete line is engineered by power-cable specialists for use with *any* make of cable. Parts are *fully* interchangeable for greater adaptability, faster delivery, easier installation and lower cost.

Not hundreds—but thousands of different ANACONDA Potheads can be made up from relatively few interchangeable parts. There's a type for every use—capnut, transformer, switchgear, disconnect, and through types.

Over 2000 different pothead assemblies can be furnished from standard parts for any particular conductor size and voltage rating in the multi-conductor capnut type alone!

To keep pace with the increasing demand for ANACONDA Accessories, it has been necessary again to greatly increase the facilities of the Cable Accessories Department. This Department is now in a position to promise prompt shipment on most of your orders.

Service continuity demands both power cable and its accessories built to highest standards. Top performance from ANACONDA Cable Accessories is assured because they are designed by engineers who are power-cable specialists.

Make Anaconda your headquarters call on your Anaconda Representative to get the benefit of Anaconda's engineering experience. 52441

Accessories for all types and sizes of bare and insulated conductors.

ANACONDA®

Anaconda Wire & Cable Company,
25 Broadway, New York 4, N. Y.

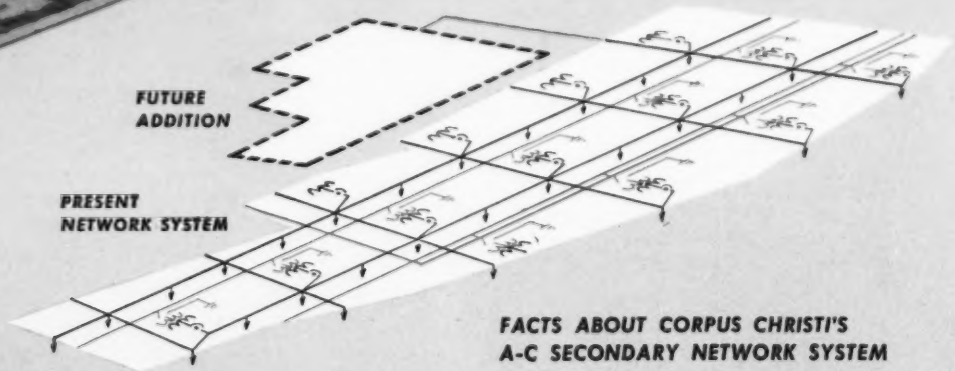
Send me Anaconda's new 100-page Pothead Terminal Catalog for use as a reference book to simplify ordering and specifying.

NAME.....

FIRM.....

ADDRESS.....

IN Corpus Christi



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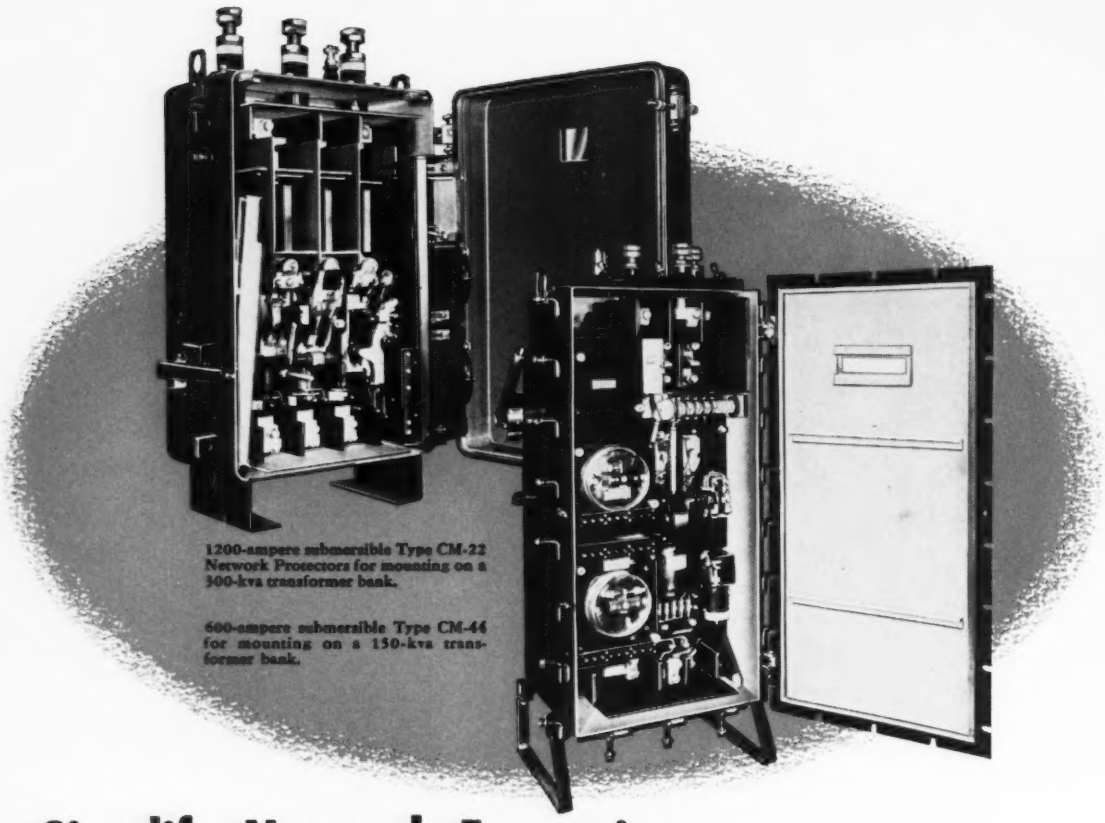

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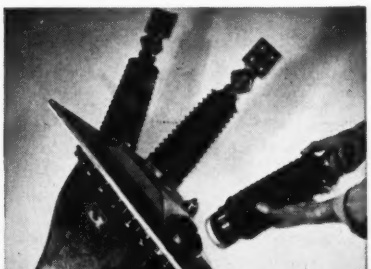
This complete line is engineered by power-cable specialists for use with *any* make of cable. Parts are *fully* interchangeable for greater adaptability, faster delivery, easier installation and lower cost.

Not hundreds—but thousands of different ANACONDA Potheads can be made up from relatively few interchangeable parts. There's a type for every use—capnut, transformer, switchgear, disconnect, and through types.



Replacement of damaged insulators is simple on AnacondA Potheads. Note the ease with which any insulator can be quickly inserted.

Over 2000 different pothead assemblies can be furnished from standard parts for any particular conductor size and voltage rating in the multi-conductor capnut type alone!

To keep pace with the increasing demand for ANACONDA Accessories, it has been necessary again to greatly increase the facilities of the Cable Accessories Department. This Department is now in a position to promise prompt shipment on most of your orders.

Service continuity demands both power cable and its accessories built to highest standards. Top performance from ANACONDA Cable Accessories is assured because they are designed by engineers who are power-cable specialists.

Make Anaconda your headquarters for potheads, jointing kits, insulating compounds, paints, etc. For help on your cable and installation problems call on your Anaconda Representative to get the benefit of Anaconda's engineering experience. 52461

Accessories for all types and sizes of bare and insulated conductors.

ANACONDA®

Anaconda Wire & Cable Company,
25 Broadway, New York 4, N. Y.

Send me Anaconda's new 100-page Pothead and Terminal Catalog for use as a reference book and to simplify ordering and specifying.

NAME.....

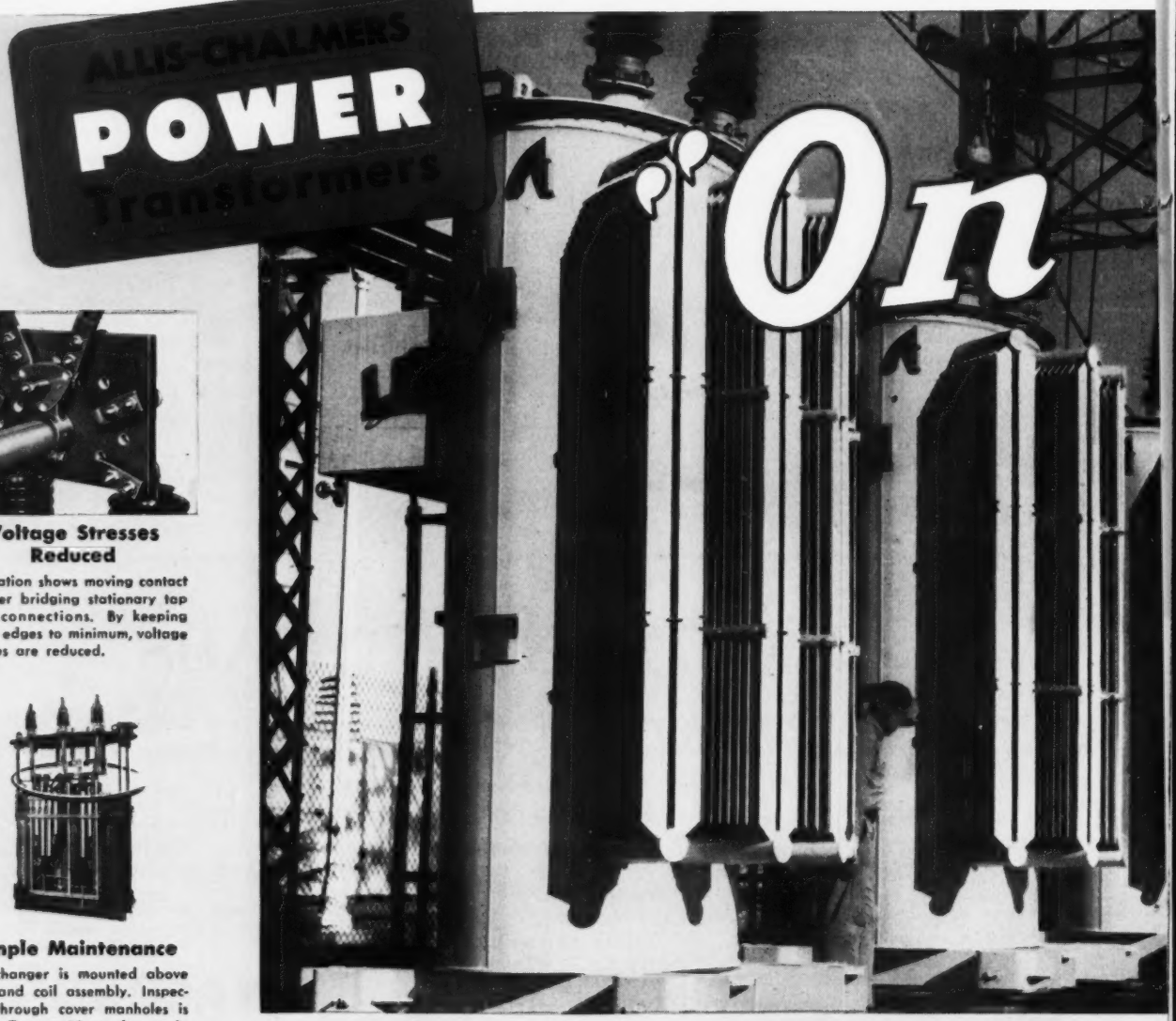
FIRM.....

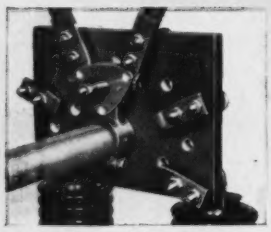
ADDRESS.....

CITY.....STATE.....

ANACONDA ON THE PACIFIC COAST: Plant at: Orange, Calif. District Offices at: Los Angeles, Calif.; San Francisco, Calif.; Seattle, Wash.

Gives You Outstanding



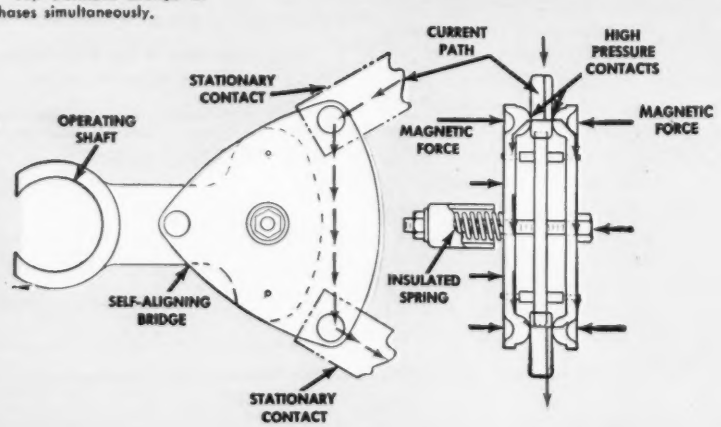


Voltage Stresses Reduced

Illustration shows moving contact member bridging stationary tap lead connections. By keeping sharp edges to minimum, voltage stresses are reduced.

Simple Maintenance

Tap changer is mounted above core and coil assembly. Inspection through cover manholes is easy. Tap positions change in all phases simultaneously.



How It Works

A positive flow path is established under high unit pressure by a round point on a flat contact surface. High unit pressure promotes low contact resistance, deters heating.

Parallel plates form movable contact bridge. Magnetic forces that are set up as a result of the flow of parallel currents in the bridge prevent "throw open" when a short circuit occurs.

Get the illustrated data sheet with all the details from your nearest A-C office or write Allis-Chalmers, Milwaukee 1, Wis.

Performance

the Line"

What power transformer is best for your system? This decision is difficult — transformers may look alike, have standardized ratings and specifications. Yet, there is *one big variable* — QUALITY — that *extra* measure of value which means better continuity of service.

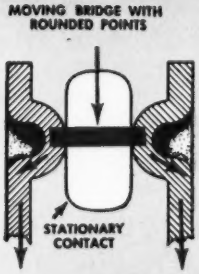
For over a half century Allis-Chalmers has been earning the approval of utility men who say A-C transformers give outstanding performance. You can depend on Allis-Chalmers design, construction and attention to details because experience proves you get the most advanced, the most economical answer to your problems from A-C.

All of this adds up to reliability, versatility and ease of operation. Make sure you talk over your next power transformer requirements with Allis-Chalmers.

A-4009

This Tap Changer Design Gives The Advantage of Point Contact

YOU CAN SEE from the diagram at left how the rounded point on a flat surface establishes a single current path per contact. This tap changer design meets five requirements for good design:



- **Contact members are flexible and self-aligning.**
- **Provides equal and positive contact pressure.**
- **Magnetic forces utilized to increase contact pressure.**
- **Gives a single established current path per contact.**
- **Strong wiping action cleans contact thoroughly when tap positions are changed.**

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Milwaukee 1, Wisconsin

BLACK—½- and 1½-inch diameters
RED—¾- and 1¼-inch diameters
BLUE—1- and 2-inch diameters

COLORED WRAPPING TAPE ON G-E EMT TELLS **Size at a Glance**

Size-indicating colored wrapping tape helps you to select sizes of G-E electrical metallic tubing quickly and easily. The tape keeps bundles firm—individual length won't slide out.

You'll also appreciate these other important features of G-E EMT...

- **Glasslike surface inside.** Special blue Glyptal* coating is baked on. It makes wire pulling easier.
- **Uniform zinc coating outside**—for long-lasting corrosion protection.
- **A smooth seam**—no burrs or rough surfaces to damage insulation.
- **High-grade steel**—specially selected for proper bending qualities.

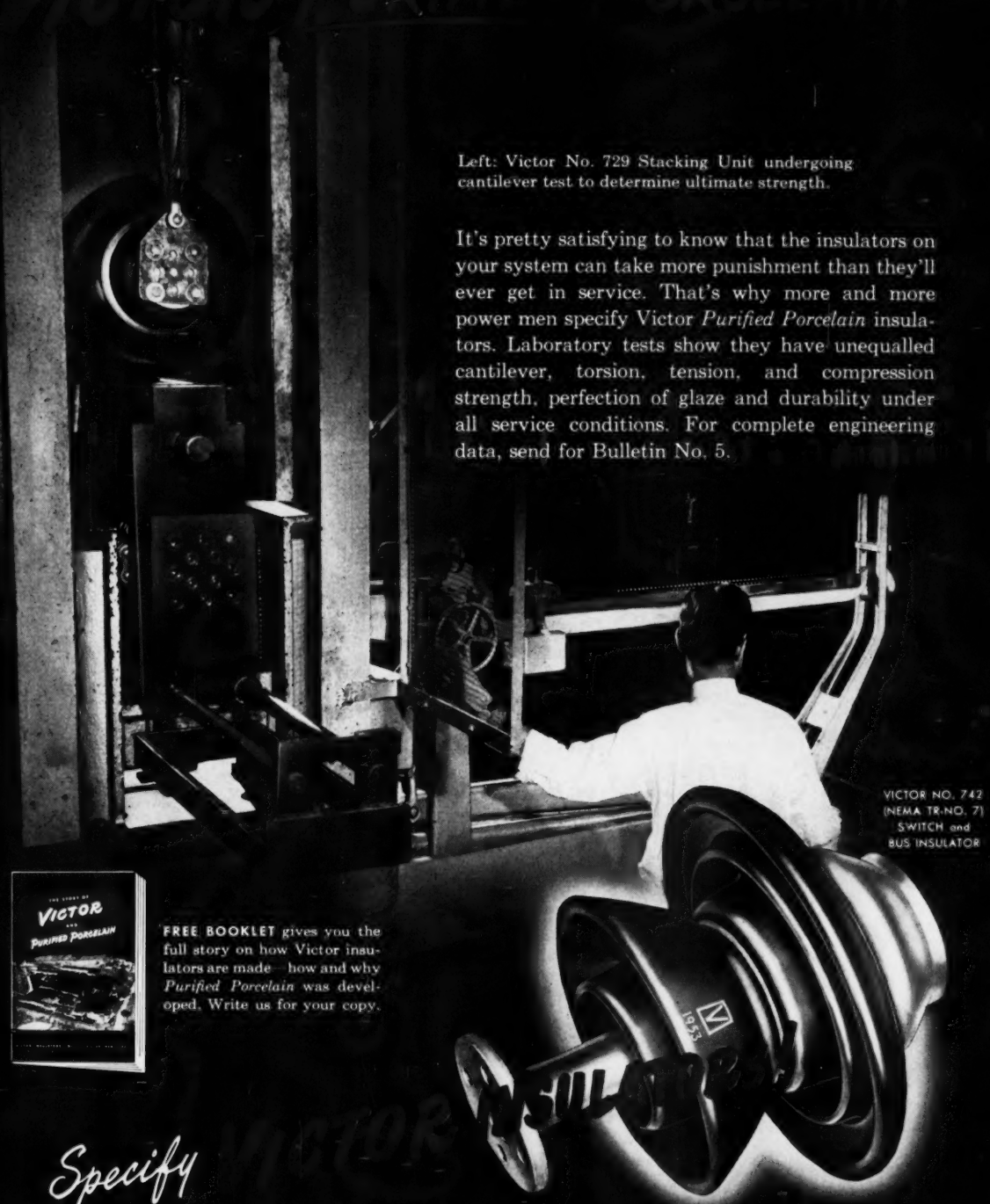
Try G-E EMT on your next job. You'll like the way it handles and the way it makes wire pulling easy. For more information, write Section C19-325, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

**Registered Trade-mark General Electric Company*

You can put your confidence in—

GENERAL ELECTRIC

. . . but they can if they're made of



Left: Victor No. 729 Stacking Unit undergoing cantilever test to determine ultimate strength.

It's pretty satisfying to know that the insulators on your system can take more punishment than they'll ever get in service. That's why more and more power men specify Victor *Purified Porcelain* insulators. Laboratory tests show they have unequalled cantilever, torsion, tension, and compression strength, perfection of glaze and durability under all service conditions. For complete engineering data, send for Bulletin No. 5.

VICTOR NO. 742 (NEMA TR-NO. 7) SWITCH and BUS INSULATOR

FREE BOOKLET gives you the full story on how Victor insulators are made—how and why *Purified Porcelain* was developed. Write us for your copy.

Specify

VICTOR INSULATORS, INC., VICTOR, N. Y.

Low and High Voltage Pintypes • Suspensions • Guy Strains • Spools • Switch and Bus Insulators • Custom Designed Porcelain

DESIGNED

. . . with These Points in Mind!

Type MH-2P

DUNCAN

Type MH
POLYPHASE
METERS

Type MH-2S

CAPACITY

Elements mounted in the back of the meter allow shortest possible current coil leads—more capacity can be built in. All MH 50-ampere socket-type meters have adequate capacity for 200 amperes continuous load, when installed in mounting devices of comparable capacity.

SURGE RESISTANCE

The electromagnet insulation has been increased to provide twice the minimum acceptable safety factor. An Alnico damping magnet prevents calibration changes due to lightning surges.

ACCESSIBILITY

As with all Duncan meters, adjustments are accessible from the front. "Microset" action greatly reduces testing time. Meter discs are accessible for every type of testing.

APPEARANCE

The Type MH polyphase meter is a meter of clean-cut design. A neat appearing "utility representative" on any customer's premises.

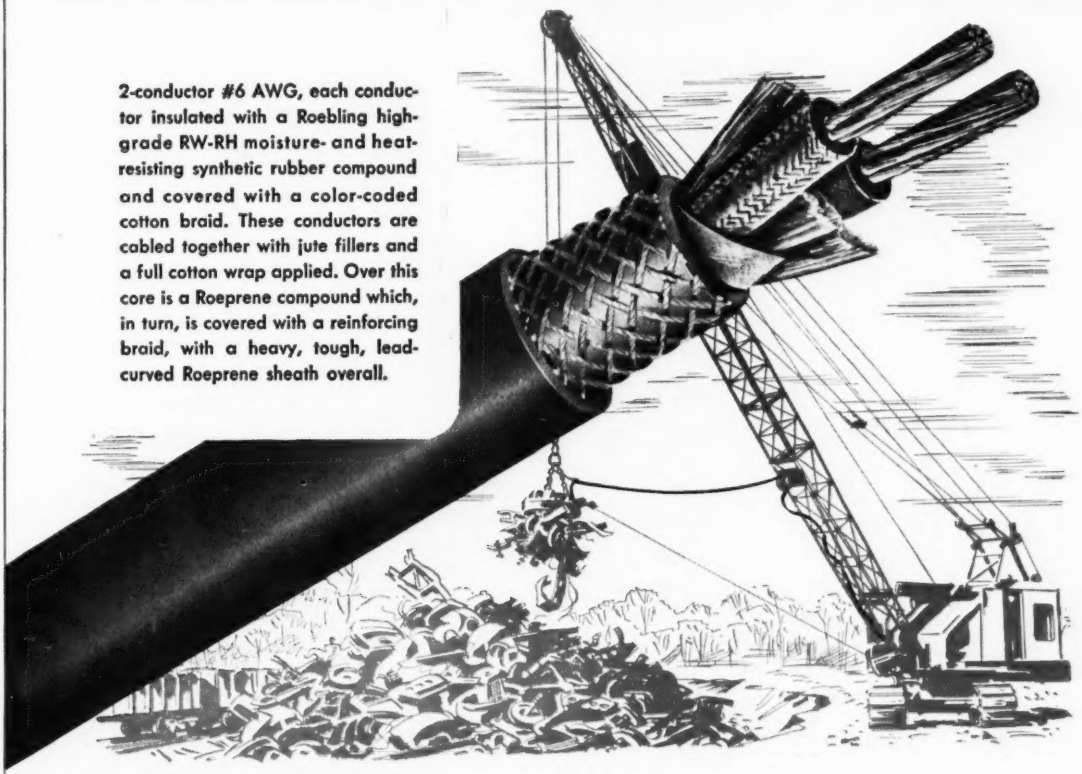
DUNCAN

makers of watthour meters for over fifty years

DUNCAN ELECTRIC MFG. CO. **LAFAYETTE, INDIANA**

ROECLAD PORTABLE POWER CABLES

2-conductor #6 AWG, each conductor insulated with a Roebling high-grade RW-RH moisture- and heat-resisting synthetic rubber compound and covered with a color-coded cotton braid. These conductors are cabled together with jute fillers and a full cotton wrap applied. Over this core is a Roeprene compound which, in turn, is covered with a reinforcing braid, with a heavy, tough, lead-curved Roeprene sheath overall.



Roebling Roeclad Lifting Magnet Cables outlast all others 2 to 1

Roebling Roeclad Lifting Magnet Cable is engineered and produced to withstand rough treatment and to give long service life. The design of this cable is based on field experience of more than 30 years.

Exhaustive tests performed in Roebling laboratories to prove the superiority of Roeclad Lifting Magnet Cables included fatigue and impact tests of representative samples.

In a fatigue test, cable samples after being subjected to more than 2,000,000 reversals—half at room temperature and half at 0°F.—showed no damage to either of the two conductors.

In impact tests, it required over 3000 blows of a 20-lb. weight dropped 5½ inches, 25 times per minute, to cause failure of a two-conductor #8 AWG Roeclad Lifting Magnet Cable.

And a report from an engineering company which has a large number of machines equipped with magnets is typical of the entire field... that Roeclad Lifting Magnet Cable out-performs competitive cables by at least 2 to 1.

Through unending research and development, Roebling's complete electrical line is constantly being improved. You can always buy Roebling with assurance of top efficiency and economy. John A. Roebling's Sons Corporation, Trenton 2, N. J.

Subsidiary of The Colorado Fuel and Iron Corporation

ROEBLING

ATLANTA, 934 AVON AVE • BOSTON, 51 SLEEPER ST & 5 PITTSBURGH ST • CHICAGO, 5525 W. ROOSEVELT RD • CINCINNATI, 3253 FREDONIA AVE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST • DETROIT, 915 FISHER BLDG • HOUSTON, 6216 NAVIGATION BLVD • LOS ANGELES, 5340 E. HARBOR ST & 120 S. HEWITT ST • NEW YORK, 19 RECTOR ST • ODESSA, TEXAS, 1920 E. 2ND ST • PHILADELPHIA, 230 VINE ST • PITTSBURGH, 1301 CLARK BLDG • ROCHESTER, 1 FLINT ST • SAN FRANCISCO, 1740 17TH ST • SEATTLE, 900 1ST AVE S. • ST. LOUIS, 3001 DELMAR BLVD • TULSA, 321 N. CHEYENNE ST • EXPORT SALES OFFICE, TRENTON 2, NEW JERSEY

CF&I

JAR ROEBLING

The Dimensional Stability of NILVAR* Spells Perfect Product Performance
Schematic diagram shows how useful movement of Nilvar rod corresponds faithfully to the dimensional changes of the copper tube.
FIG. 1
NILVAR
COPPER
HOT LENGTH
FIG. 2
USEFUL MOVEMENT
COLD LENGTH
CONTRACTION
Robertshaw-Grayson "Unitrol" fully automatic temperature control for gas water heaters

How Robertshaw-Fulton built a better Water Heater Control with Driver-Harris NILVAR

The new "Unitrol" Robertshaw-Grayson gas water heater control streamlines three essential controls into one valve body: a snap action thermostat, a snap action pilot, and a large-capacity gas cock. This reduces inventory for the water heater manufacturer and simplifies part stocking for the dealer.

The "Unitrol" provides a thermostat capable of delivering maximum amount of useful movement, by employing a copper tube enclosing a Nilvar alloy rod. The tube expands and contracts very appreciably in response to immersion temperatures. But the Nilvar rod, because it is dimensionally stable, does not vary in length. Since the free end of the Nilvar rod actuates the working gas valve, the slightest movement of the temperature-sensitive copper tube is fully utilized to control flow of gas to the burner.

Says Robertshaw-Fulton: "The outstanding dimensional stability of Nilvar actually permits minute changes in water temperature to regulate the heat supplied by the burner, thus assuring extremely accurate operation."

Nilvar has a temperature coefficient of expansion as low as .000001 per degree C., lowest of any alloy; comparable to that of quartz. Somewhere in your engineering operations such extraordinary dimensional stability may solve a problem—help to perfect product performance. We shall be glad to make recommendations based on your particular needs.

*T.M. Reg. U.S. Pat. Off.

Nilvar is produced only by

Driver-Harris Company

Western Representative: **ANGUS-CAMPBELL, INC.**

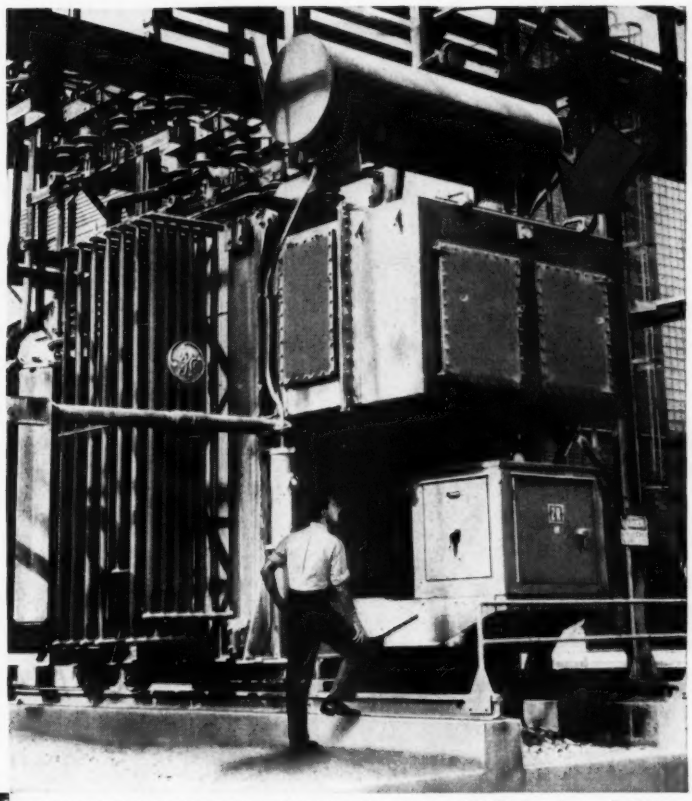
5320 Santa Fe Ave., Los Angeles 58 917 Bryant St., San Francisco 3

Main Office and Plant: HARRISON, NEW JERSEY

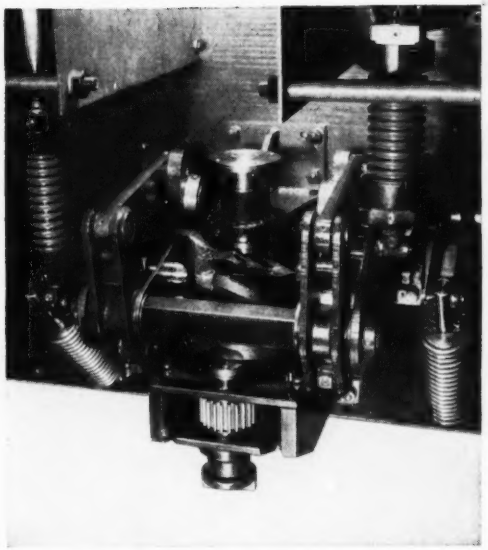
MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE, AND ELECTRONIC ALLOYS IN THE WORLD

No appreciable mechanical wear after 1,017,706 tap changes

G-E load-ratio-control averages 800 tap changes a day at Alcoa plant



G-E LOAD-RATIO-CONTROL TRANSFORMER rated 40,000 kva (output) 13.8 kv, installed at Alcoa's Vancouver plant, provides ±5% voltage regulation.



MILLIONS OF TROUBLE-FREE OPERATIONS are built into this hardened steel cam assembly—typical of the mechanical strength of G-E load-ratio-control. Each new LRC design must pass mechanical-life tests of several million operations before it can be approved for production.

The load-ratio-control equipment on this transformer really has to "take it." Installed on January 16, 1946, it has already completed more than a million tap changes under load! At its last inspection on January 17, 1951, Alcoa found the LRC mechanism in excellent working order. None of the mechanical parts—bearings, pins, cam rollers or cam surfaces—showed appreciable wear.

Without a rugged mechanical system, the toughest electrical parts would be worthless. That's why every new LRC design must pass mechanical-life tests equal to at least 30 or 40 years of ordinary service!

Requires less routine maintenance, too!

With G-E load-ratio-control, you don't do any *unnecessary* service work. The instruction book which accompanies each unit tells how many operations you can expect the LRC equipment to perform before you have to replace contact tips and clean insulation.

This means you can eliminate unnecessary inspections. Simply refer to the instruction book and read the operations counter to schedule maintenance only when it is needed!

Over 39,000,000 installed kva have proved that General Electric LRC is as reliable as the core and coils themselves.

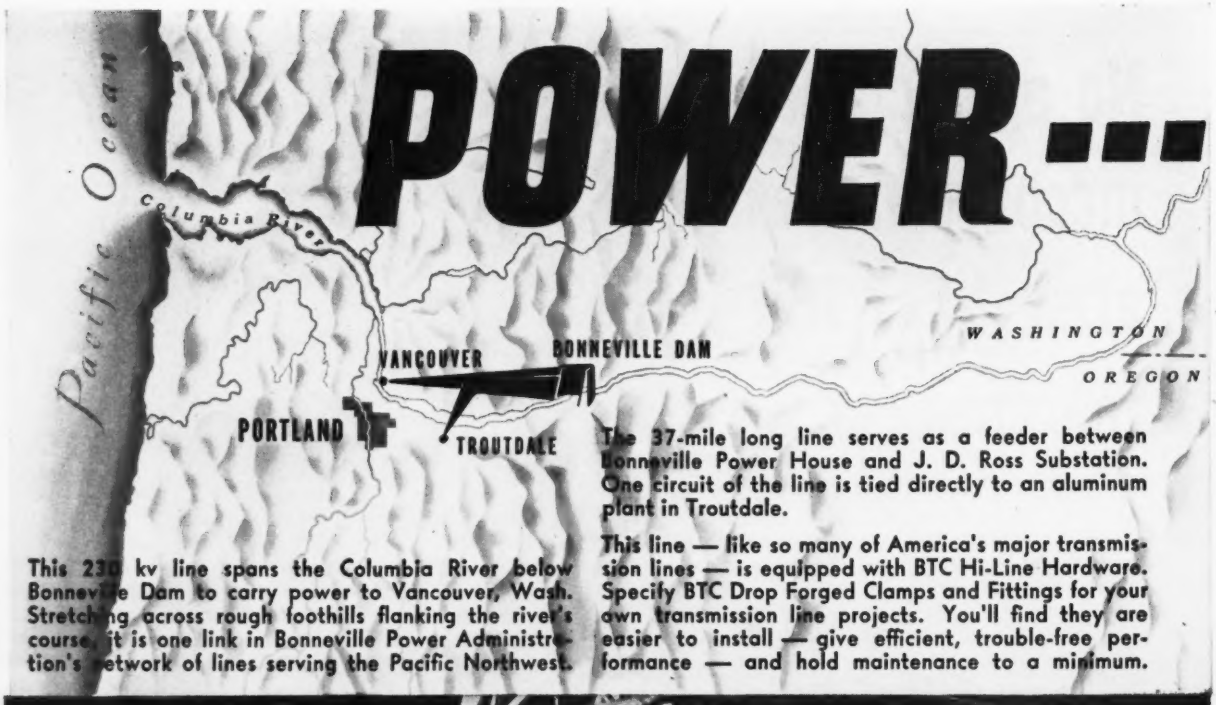
General Electric Company, Schenectady 5, New York.

401-22

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

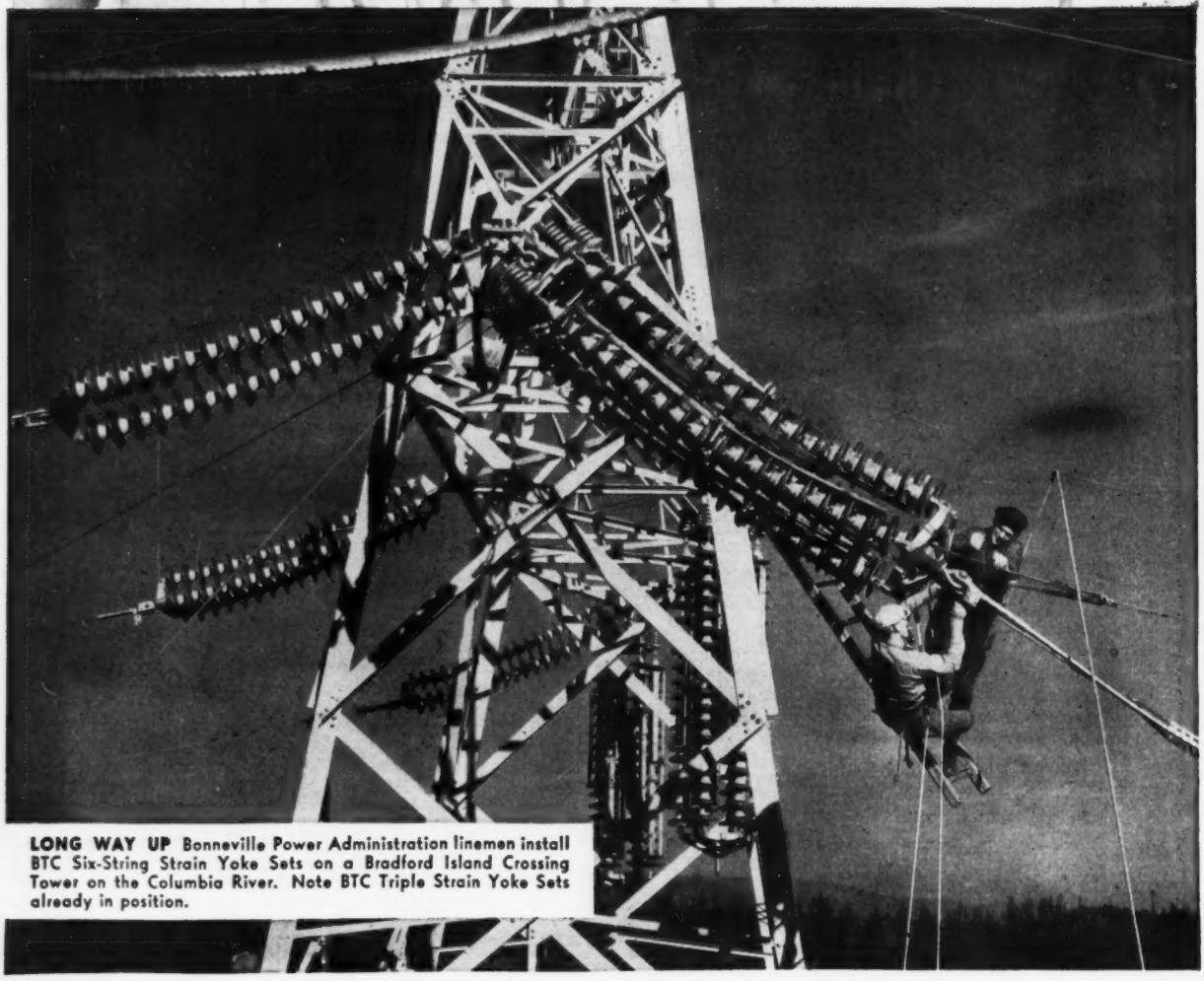
POWER...



This 230 kv line spans the Columbia River below Bonneville Dam to carry power to Vancouver, Wash. Stretching across rough foothills flanking the river's course, it is one link in Bonneville Power Administration's network of lines serving the Pacific Northwest.

The 37-mile long line serves as a feeder between Bonneville Power House and J. D. Ross Substation. One circuit of the line is tied directly to an aluminum plant in Troutdale.

This line — like so many of America's major transmission lines — is equipped with BTC Hi-Line Hardware. Specify BTC Drop Forged Clamps and Fittings for your own transmission line projects. You'll find they are easier to install — give efficient, trouble-free performance — and hold maintenance to a minimum.

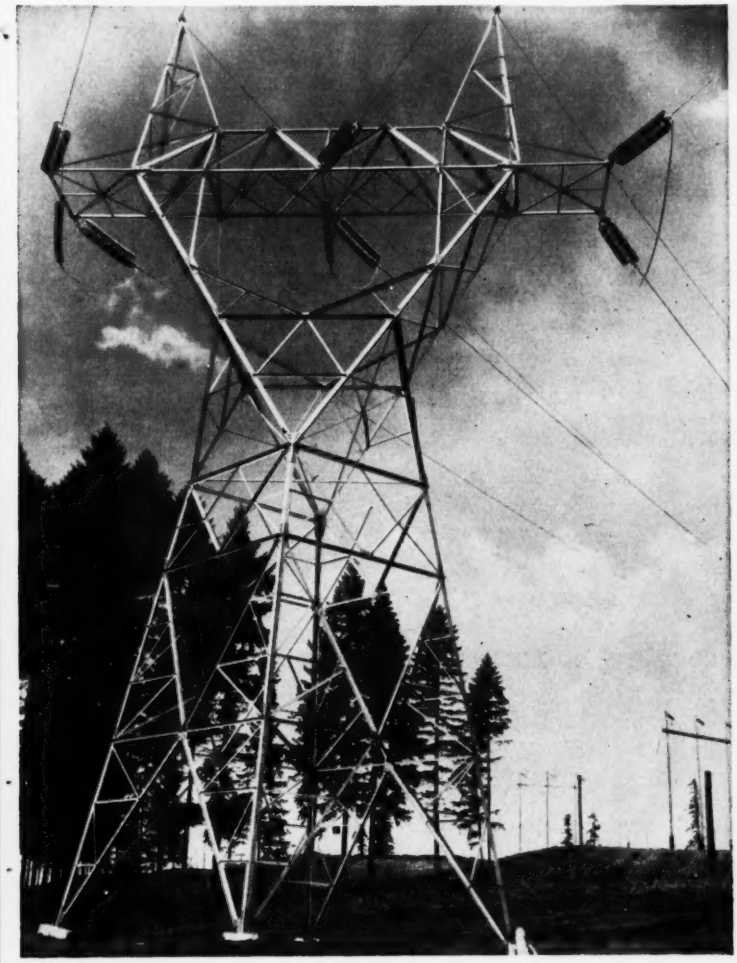


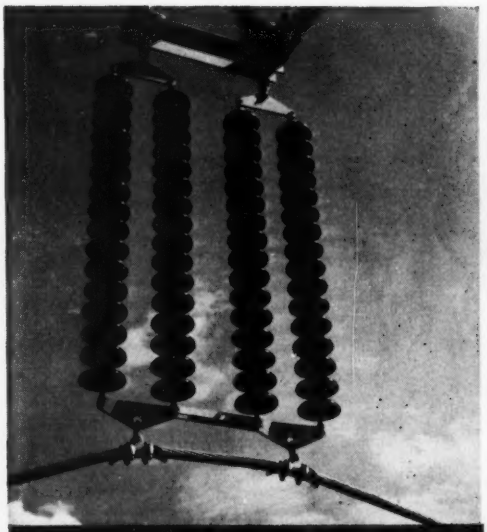
LONG WAY UP Bonneville Power Administration linemen install BTC Six-String Strain Yoke Sets on a Bradford Island Crossing Tower on the Columbia River. Note BTC Triple Strain Yoke Sets already in position.

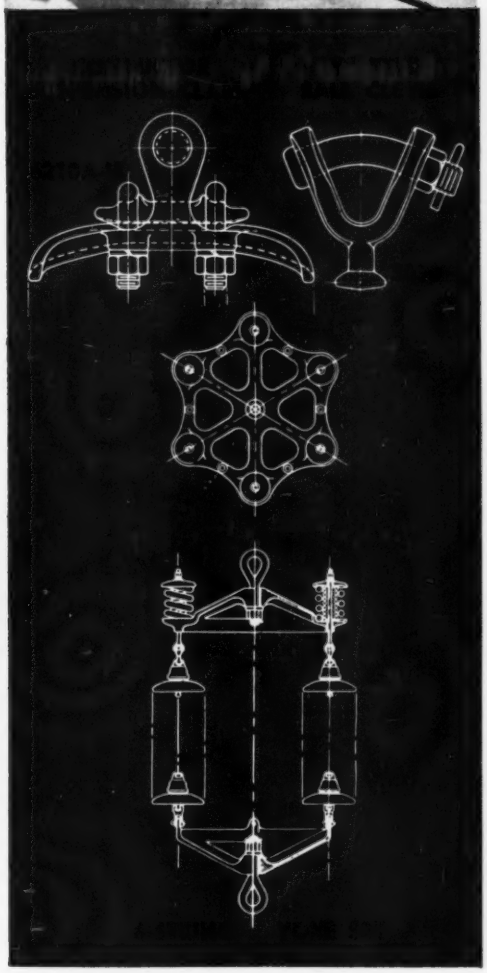
for the Pacific Northwest

BIRD'S EYE VIEW Two BTC Double Strain Yoke Sets with suspension clamps and stabilizer bar are installed on a Bradford Island Crossing Tower high above the Columbia River.

TYPICAL TOWER This single circuit angle dead-end tower is typical of those found along the 37-mile stretch between Bonneville and Vancouver. BTC Triple Strain Yoke Sets are used.







Sold Through Your Insulator Manufacturer Only

Drop Forged BTC Hi-Line Hardware

The BREWER-TITCHENER Corporation

Cortland · New York

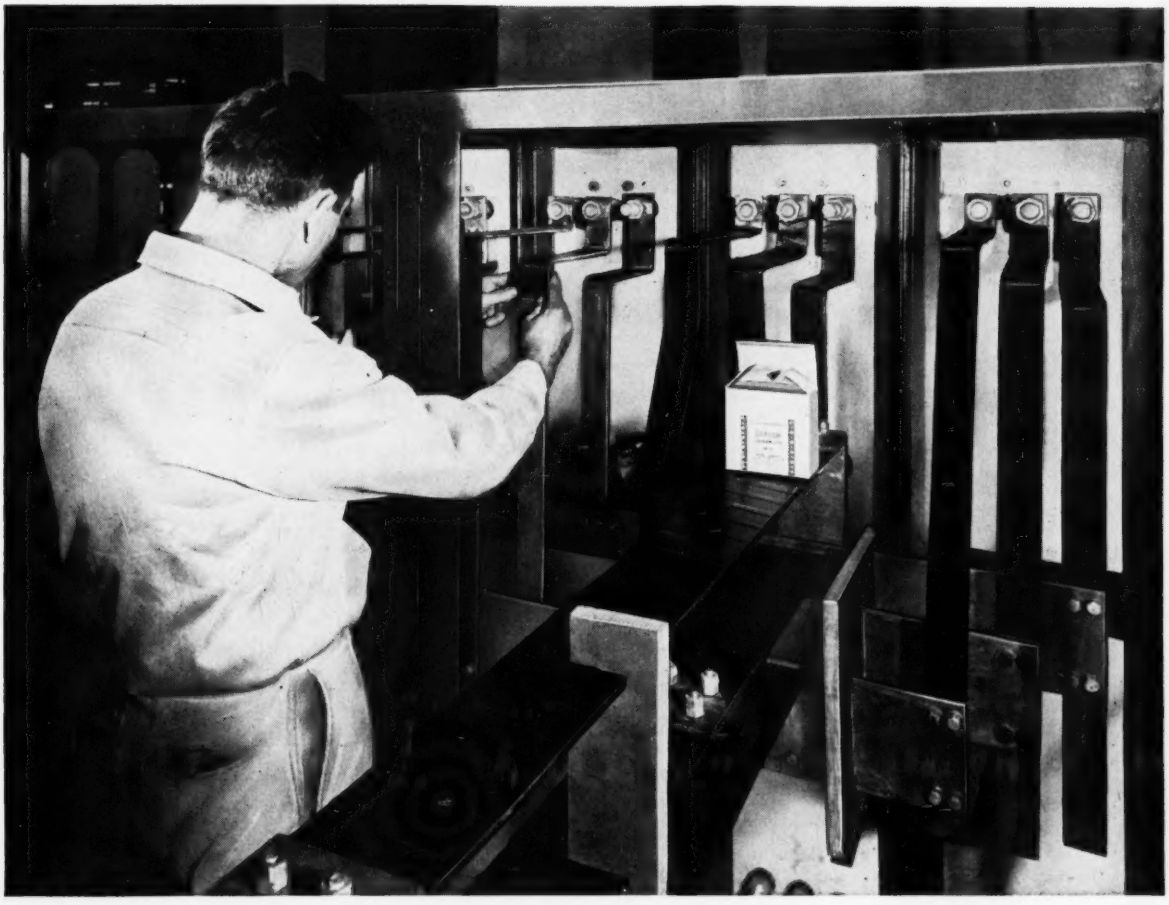
SMITH-FRANCIS TURBINES AT TOKETEE

ADDING to an ever-growing list of users, the Toketee Development of the California-Oregon Power Company has installed three vertical Smith-Francis units of 17,600 H.P. capacity each, under 394 feet head, operating at 400 r.p.m. The turbine runners are stainless steel. The pressure regulators are of a new horizontal discharge design of the Howell-Bunger Valve type.

Put your hydraulic problems up to us!

S. MORGAN SMITH Co.

YORK, PENNA. U.S.A.



How to wind up a big job quicker . . . neater . . . cheaper!

A single half-lapped layer of "Scotch" Plastic Electrical Tape is all you need for results like this! Think how much tape you save. Think how much *time* you save. Yet plastic tape does *more* than save you money.

It gives you *dependable* protection. The plastic backing resists acids, oils, alcohols—even abrasion and weathering.

And what a man-sized job it does for the little space it takes! In the 7 mil thickness—"Scotch" 33—it has a dielectric strength of 10,000 volts. The 10 mil thick tape—"Scotch" 22—gives equal electrical protection with extra abrasion resistance.

Try it today and see! See how it conforms to angles and odd-shaped fixtures. See how it sticks tight—leaves no gaps or voids, no "open doors" to trouble.

Your supplier has this remarkable tape in stock. Put it on your "want list" now!

3M COMPANY

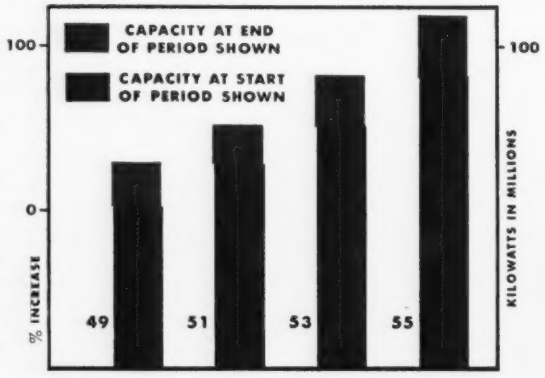
The term "Scotch" and the plaid design are registered trademarks for the more than 200 pressure-sensitive adhesive tapes made in U.S.A. by **Minnesota Mining & Mfg. Co., St. Paul 6, Minn.**—also makers of "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Nonslip Surfacing, "3M" Abrasives, "3M" Adhesives. General Export: 122 E. 42nd St., New York 17, N. Y. In Canada: London, Ont., Can.

KEEPING PACE . . .

Today, electrical power production must constantly be expanded to keep pace with industrial and consumer demands. Utility forecasts of future needs are far in excess of today's capacity. Moloney is, and has been, expanding its facilities to keep pace with utility and industrial requirements . . . in short, keeping pace with the power picture. Today, Moloney's capacity is 130% greater than in 1949. Plant expansions, now nearly completed, permit construction of power transformers in the 150,000 Kva, 230 Kv class. So, today or tomorrow, as you did yesterday . . . *specify Moloney,* for better performance, greater reliability, less maintenance!

WHAT THE INDUSTRY NEEDS

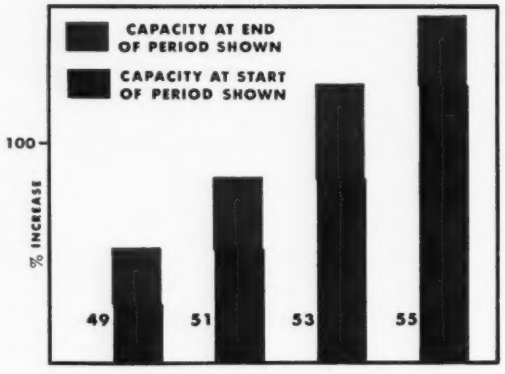
Forecasts by American Utilities of Kilowatt capacity through 1955 are shown in diagram at right. Shown also in blue are the utility needs which were accomplished each year since 1949 as well as the Kilowatt capacity that will be required through the year 1955.

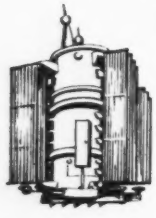


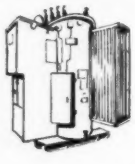
WHAT MOLONEY IS PROVIDING

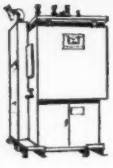
Since 1949 Moloney's expansion of its facilities has increased its capacity 130%. Overall industry demands plus a growing preference for Moloney products necessitate still further expansions which are now under way and will be completed this year.

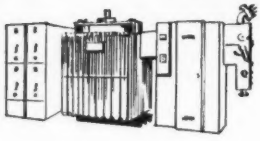
ME53-4











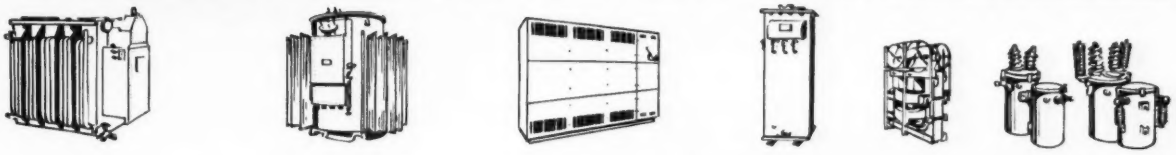
M O L O N E Y E L E C T R I C

Manufacturers of Power Transformers • Distribution Transformers • Load Ratio Control

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS

• WITH THE POWER PICTURE

Shown in outline above, new construction now under way at the Moloney Plant, which includes a crane bay 70 feet high, 80 feet wide and 530 feet long to be equipped with two 100 ton cranes and other equipment necessary for building transformers in the 150,000 Kva, 230 Kv class.

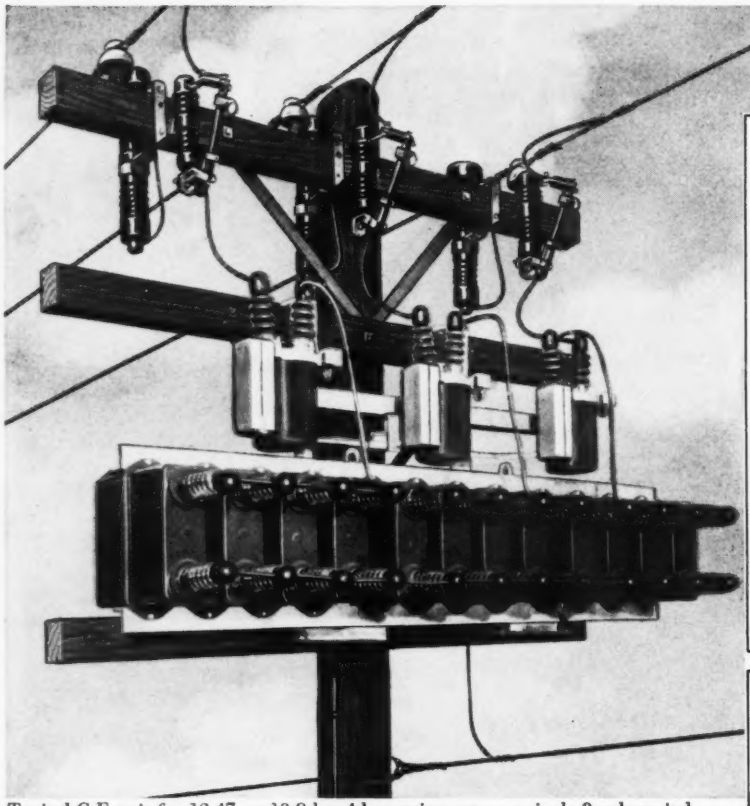


C O M P A N Y

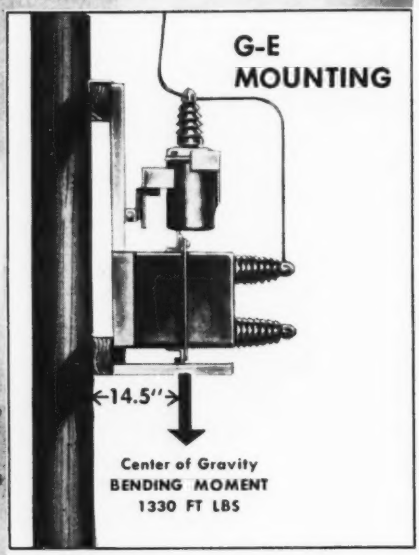
Transformers • Step Voltage Regulators • Unit Substations

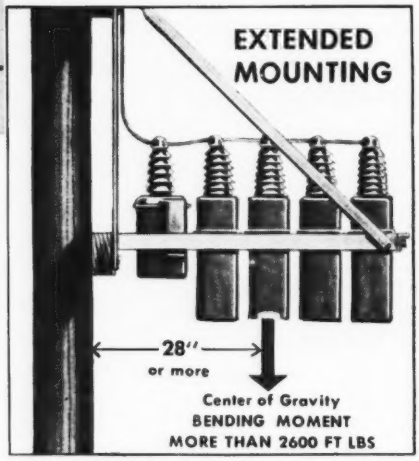
MO. AND TORONTO, ONT., CANADA

MOLONEY ELECTRIC = { BETTER PERFORMANCE / GREATER RELIABILITY / LESS MAINTENANCE



Typical G-E unit for 12.47 or 13.8 kv. 4-kv equipment uses single 3-pole switch.





LESS OVERHANG. Exclusive side mounting of G-E capacitors brings center of gravity almost 50% closer to pole, reduces bending moment, puts less strain on crossarms and poles.

G-E auto-switch equipment puts less strain and weight on pole

Side mounting of capacitors in General Electric auto-switch equipment brings the center of gravity of the equipment almost 50% closer to the pole than extended mounting. There's less strain on crossarms and poles. And because G-E capacitors are up to 25% lighter, the total weight on the pole is considerably reduced.

Neater, more compact design. G-E auto-switch capacitors—completely assembled, wired, and tested at the factory—arrive ready to install. All you do is hoist, bolt, and connect. Side mounting eliminates guy wires and extra braces—provides a neater, more compact appearance. Inspection and servicing are simplified.

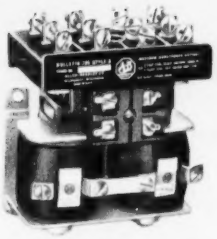
Voltage regulating relay, the same as used in G-E regulator control to provide Class I accuracy, assures reliable control regardless of temperature or weather changes. Voltage and/or current-sensitive automatic controls are available. Controls, enclosed in separate weathertight housing for mounting at the base of the pole, are easy to inspect.

Available in 225 and 300-kvar ratings, from 2400 to 13,800 volts, this compact auto-switch equipment costs you no more. Get in touch with your nearest G-E Apparatus Sales Office for more information. General Electric Co., Schenectady 5, New York. 407-40

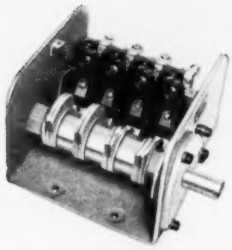
ACCURATE CONTROL with famed voltage regulating relay. Weathertight housing mounts separately—permits easy inspection.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

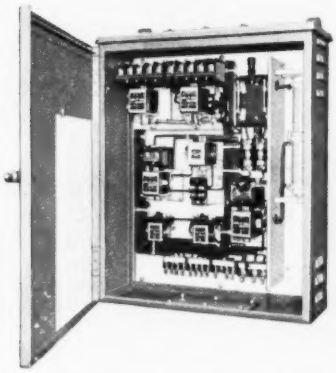


Bulletin 705 Reversing Switch for small a-c and d-c motors

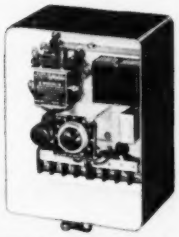


Bulletin 801 Rotating Adjustable Cam Limit Switch. Heavy duty

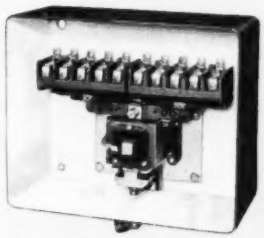
Bulletin 850 Motor Driven Timer for automatic process control



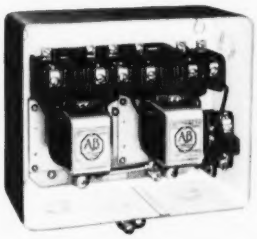
Bulletin 290R D-C Reduced Voltage, Reversing Starter for marine service



Bulletin 852 Electronic Time Delay Relay for precision timing



Bulletin 704 Nine-pole Permanent Magnet Contactor. Noiseless



Bulletin 205 Size 1 Reversing Switch for direct current motors

Bulletin 350 Drum Switch for reversing small a-c and d-c motors

Bulletin 365 Drum Controller for multispeed a-c motors

Some Useful Units in the

ALLEN-BRADLEY LINE

The standard Allen-Bradley line includes a wide range of solenoid operated across-the-line starters, combination starters, reversing switches, reduced voltage starters, and multispeed controls . . . not to mention an extensive variety of relays, contactors, and accessories.

And that is not all!

It also includes many other useful items . . . a few of which are shown here. They find application in the process industries, in marine service, in laundries, and in many other industries. All are designed for long, trouble free life and built to the widely recognized QUALITY standards that apply to the entire Allen-Bradley line.

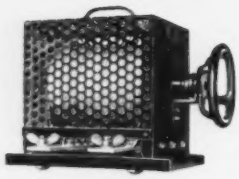
If you use motor controls . . . it will pay you to become acquainted with the latest Allen-Bradley Catalog. May we send you a copy?

Allen-Bradley Co.
1316 S. Second St. · Milwaukee 4, Wisconsin

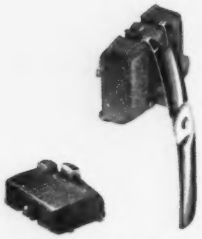
A-B Quality

ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

2-53-MR

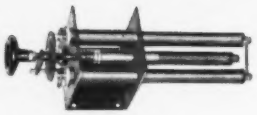


Bulletin 470 Graphite Disc Rheostat for laboratories

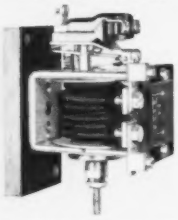


Bulletin 500 Knee and Foot Controllers for sewing machines

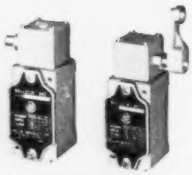
Bulletin 802 Foot Switch for heavy duty, rough service



Bulletin 410 Graphite Disc Rheostat for stepless control

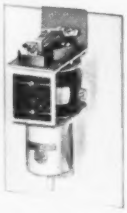


Bulletin 809 Instantaneous Current Jam-type Relay

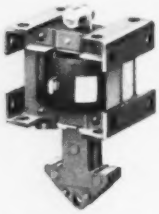


Bulletin 802 Limit Switches with various operating levers

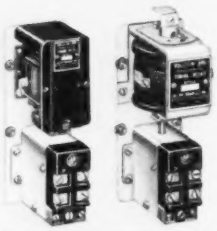
Bulletin 600 Switch with overload breaker and pilot light



Bulletin 848 Dashpot Timing Relay. Maximum interval 30 sec.

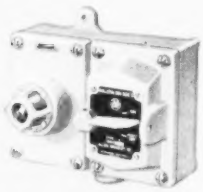


Bulletin 860 A-C Solenoid supplied in variety of ratings



Bulletin 849 Pneumatic Timers for machine tool service

Bulletin 202 D-C Contactors for applications up to 150 amperes

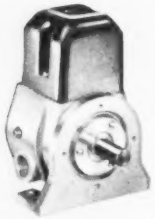


Bulletin 600 Watertight Starting Switch with pilot light

Bulletin 840 Float Switch operated by float and chain

Bulletin 800T Oiltight Push Buttons for machine tools

Bulletin 801 Rocker Arm Limit Switch for reversing service



Bulletin 808 Zero Speed Plugging Switch with magnetic lockout

Popular Accessories

in THE ALLEN-BRADLEY LINE

Above are shown a few Allen-Bradley control accessories. The variety of these units reveals the wide scope of the complete Allen-Bradley line. To machinery designers and plant engineers, the Allen-Bradley Catalog is a treasure house of standard control accessories which can be used in innumerable combinations to solve virtually any control problem. May we send you a copy of this Handy Catalog?

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

Look for the A-B trademark. It is a guarantee of Quality

ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

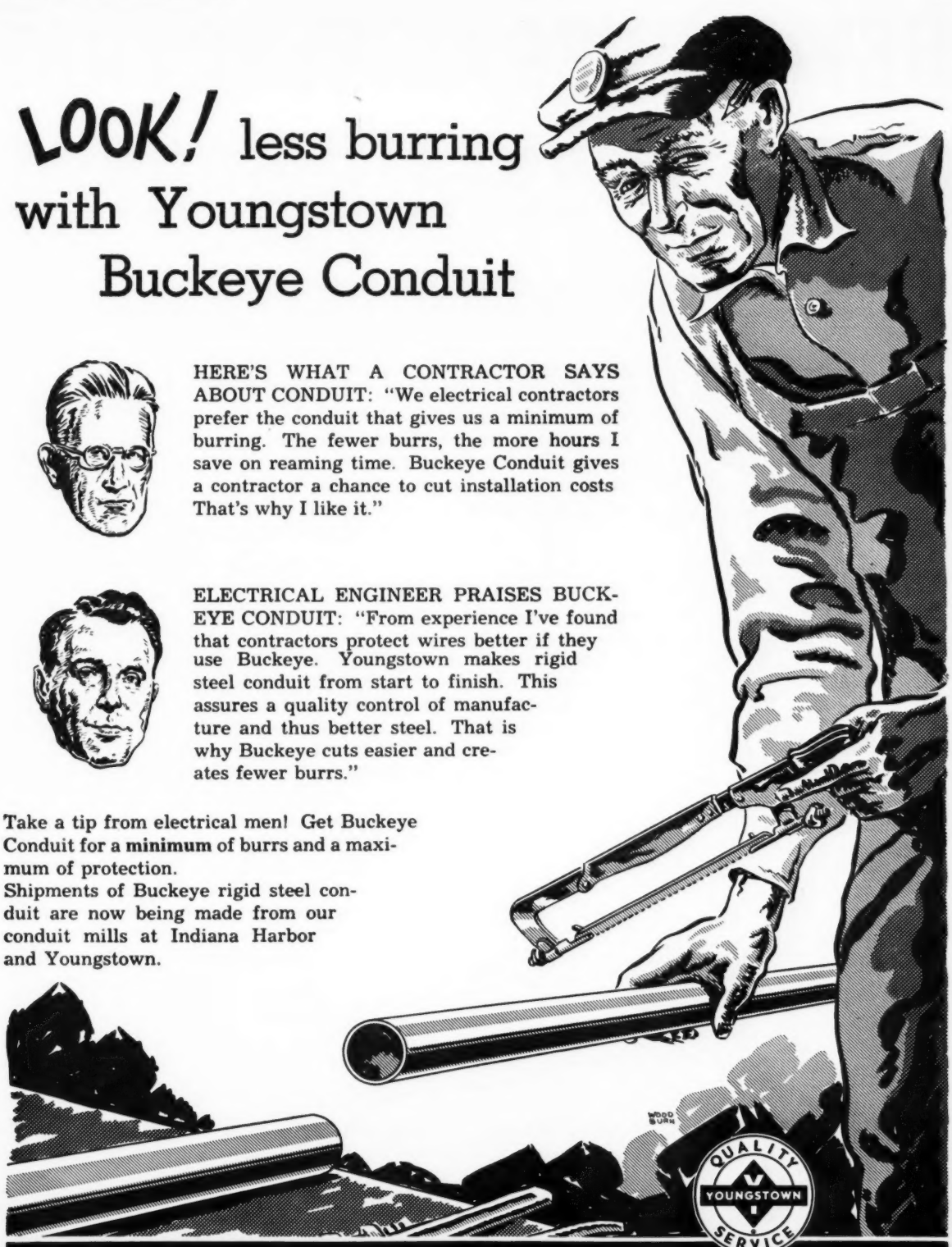
2-53-MR

LOOK! less burring with Youngstown Buckeye Conduit

HERE'S WHAT A CONTRACTOR SAYS ABOUT CONDUIT: "We electrical contractors prefer the conduit that gives us a minimum of burring. The fewer burrs, the more hours I save on reaming time. Buckeye Conduit gives a contractor a chance to cut installation costs That's why I like it."

ELECTRICAL ENGINEER PRAISES BUCKEYE CONDUIT: "From experience I've found that contractors protect wires better if they use Buckeye. Youngstown makes rigid steel conduit from start to finish. This assures a quality control of manufacture and thus better steel. That is why Buckeye cuts easier and creates fewer burrs."

Take a tip from electrical men! Get Buckeye Conduit for a **minimum** of burrs and a maximum of protection.
Shipments of Buckeye rigid steel conduit are now being made from our conduit mills at Indiana Harbor and Youngstown.



THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices — Youngstown 1, Ohio

Export Office-500 Fifth Avenue, New York

COLD FINISHED CARBON AND ALLOY BARS - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - WIRE - PIPE AND TUBULAR PRODUCTS - CONDUIT - RODS - SHEETS - PLATES - BARS - RAILROAD TRACK SPIKES.

NEW GENERAL ELECTRIC INTRODUCES A BRIGHTER

FIRST INSTALLATION of new Form 206 luminaires was made in December, 1952, by Dayton Power and Light Company, at Oakwood, Ohio. A total of 52 Form 206 luminaires light the city's main business street.

You can put your confidence in—

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

FLUORESCENT LUMINAIRE BROADER LIGHT PATTERN

Form 206 Maintains High Light Output Regardless of Temperature Changes

Now General Electric Engineers have made possible the finest whiteways in the world with the development of the new Form 206 Fluorescent Luminaire. Its high light output is held constant throughout a broad range of temperature, maintaining the lighting effectiveness in any weather conditions and throughout all hours of the night. The new six-foot "Rapid Start" G-E fluorescent lamps are designed specifically for outdoor operation. They require no starters, have no starting flicker, and light within a second after being turned on. With its broad, bright light pattern, particularly effective on wet pavements, the Form 206 Fluorescent Luminaire sets an entirely new standard of modern street lighting.

NEW, EASY INSTALLATION. Designed for speed, simplicity, and economy of installation, the Form 206's bracket is an integral part of the fixture. There are no guys, trusses, or supports. The entire unit, including bracket, weighs about 100 pounds, and is less than seven feet long.

NEW MODERN APPEARANCE. Because all wiring can be internal, appearance of the new Form 206 can be free of unsightly wire loops. The Form 206 Luminaire can house its ballast, eliminating pole mounting. Natural aluminum housing and clear plastic globe in sleek, clean design make a dramatic, modern addition to any city's main business streets.

NEW ECONOMICAL MAINTENANCE is assured with lamps rated 7500 hours for long, economical service, and the elimination of starters. A completely enclosing plastic globe minimizes the effect of water, dust and dirt. Hinged at one end, it swings down and remains in position for fast easy servicing, when necessary.

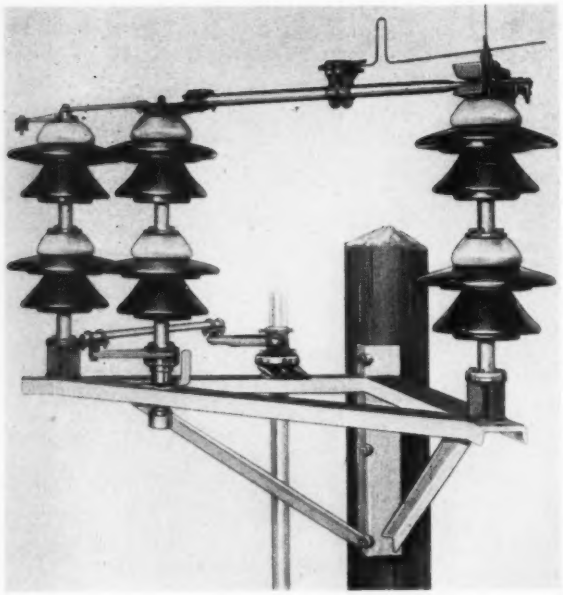
FOR MORE INFORMATION contact your nearest General Electric Sales Office or write for Bulletin GEC-963, Section 452-133, General Electric Co., Schenectady 5, New York.

1878 75 1953 YEARS OF ELECTRICAL PROGRESS

LOW MAINTENANCE COSTS are assured by features designed for rapid, easy servicing. Plastic globe, conveniently hinged, swings down for easy access by workmen. Maintenance costs are also reduced by this enclosing globe which minimizes water, dust and dirt problems. Luminaire is less than seven feet long.

FORM 206 LUMINAIRE is shown mounted on G-E aluminum pole. Sleek luminaire design combined with internal wiring and elimination of external ballast adds beauty to city streets.

PRODUCT NEWS



Three-Insulator Switch

(1) W. N. Matthews Corp., 3850 Delor St., St. Louis 16, Mo.

Designed for use at corner turns or straight through applications, this three-insulator switch has been added to the manufacturer's GOABS line. According to the announcement, line crew installation time has been reduced considerably because the switch is mounted direct to the pole and no crossarms or special structures are needed.

Contacts are silver to copper and are self-aligning; no copper braid shunts are used. The design allows 90° dead ending to the base and the vertical configuration provides 270° of free climbing space. The switches come in 15-, 23-, 34.5-, 46- and 69-kv ratings, all 600 amp. Field tests of the 69-kv switch show that GOABS will successfully break 60 miles of charging current, according to the manufacturer, who reports that details of the tests are available from the factory.

Insulating Varnish

(2) Irvington Varnish & Insulator Co., 6 Argyle Terrace, Irvington 11, N. J.

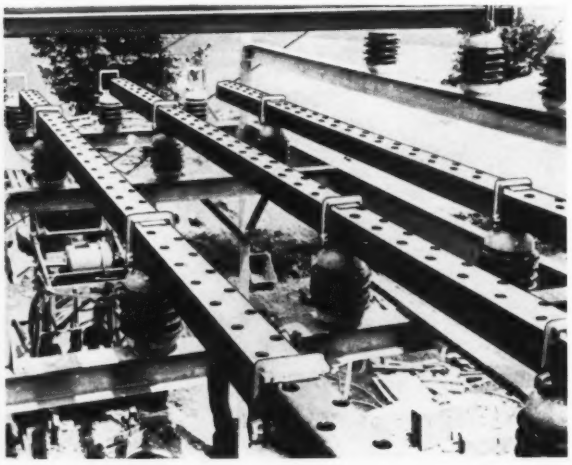
Designed for equipment where high speeds and intense vibration normally would cause wire movement and resultant electrical failures, this new No. 140 electrical insulating varnish is claimed to have outstanding mechanical strength even at Class B temperatures. Other qualities listed by the manufacturer are resistance to oils, chemicals and moisture; excellent electrical properties; exceptional storage and dip tank life. Naphtha can be used for thinning to cut solvent costs, it is pointed out.

Electrical Tape

(3) United States Rubber Co., Rockefeller Center, New York 20, N. Y.

A new vinyl plastic electrical tape is being marketed under the brand name of Royalastic. It is a plastic film about 6 mils thick. One side has a pressure-sensitive adhesive that makes the over-all thickness about 7 mils. According to the manufacturer, the black tape has a tensile strength of 20 lb per inch of width, excellent abrasion resistance, good adhesion at low temperature and dielectric strength of approximately 10,000 v.

The tape is not affected by sunlight and has no corrosive effect on electrical conductors. It is said to have excellent resistance to water, acids, alkalies, oils and aging (room temperature). It comes in 66- or 30-ft rolls ¾ of an inch wide and in 10-ft rolls ½ in. wide.



Ventilated Square Copper Tube Bus

(4) Chase Brass & Copper Co. Inc., Waterbury, Conn.

Increased current-carrying capacity for a given area of metal is claimed for ventilated square tube bus.

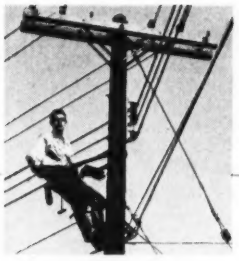
Square copper tube bus is said to give mechanical strength in all directions, with longer spans obtainable between supports, increased wind resistance and ability to withstand weight of ice and snow.

Large contact surfaces are provided for uniform pressure on relatively large areas for firm, secure joints that reduce oxidation, the manufacturer states. Joints may be made with commercial electrical connectors of the clamp type, by bolting plates to tube walls, or by brazing.

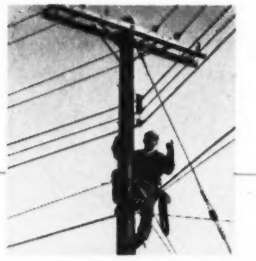
This bus is supplied with sides ranging from 2 to 11 in. for a-c loads ranging from 1,310 to 10,600 amp on the basis of 30 C temperature rise. Ventilating holes of standard sizes and spacing are usually supplied but may be omitted in areas where electrical connections will be made, the manufacturer states.

COPPER or ALUMINUM

which conductor shall it be?



"I say COPPER"



"I say ALUMINUM"

"We both agree on ANACONDA"

It's not very strange that this sort of agreement is widespread today.

Cable customers vary in their needs. Some choose copper . . . some aluminum . . . some both.

To get the best results from either metal, consider carefully both sound engineering and good economics before deciding. Whatever *your* final choice—it will pay you to *specify Anaconda.*

Anaconda offers you a *single* source of supply for transmission and distribution conductors for every type of service. Modern manufacturing techniques are backed by many years of field-engineering and construction experience plus up-to-date metallurgical and development facilities. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 52474

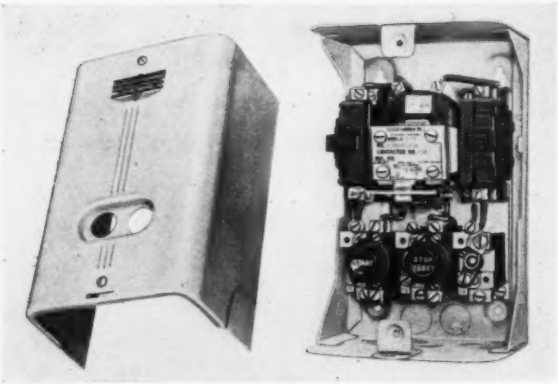
Copper and Aluminum Insulated Cables
Copper and Aluminum Service Cables
Copper, Aluminum and Copperweld Bare and Weatherproof
Copper and ACSR Transmission and Distribution
Wire and Cable Accessories

cu **or** *al*

—choose with confidence when it's

ANACONDA® wire and cable

ANACONDA ON THE PACIFIC COAST: Plant at: Orange, Calif. District Offices at: Los Angeles, Calif.; San Francisco, Calif.; Seattle, Wash.



Magnetic Starters, Contactors, Relays

(5) Cutler-Hammer Inc., 312 N. 12th St., Milwaukee 1, Wis.

A new line of magnetic starters, contactors and relays incorporates a five-unit construction designed for easier installation, better work and longer life. A wrap-around cover pulls off, exposing front and both sides of the unit for 180° accessibility. The five independent parts consist of two contact blocks, a magnet coil, an armature and a three- or two-coil overload relay mounted on a steel panel. Each part can be removed from the front without disturbing another part.

The new line features a three-coil adjustable overload relay permitting four ratings from each heater coil by changing its position. This adjustability provides protection within 3% of full load motor rating. The three-coil overload offers better protection against single phasing where unbalanced or unstable line conditions may occur.

The double-break contacts, made of a special silver alloy, can be inspected by pulling off a snap-on cover; the contacts can be removed without tools. The complete contact block may be removed by loosening two screws; the overload relay by turning out two screws. The armature, which pivots on rolling bearings, and the magnet coil may be replaced without tools. The complete panel, with all units assembled, can be taken out of the metal case by loosening three screws.

All terminals are angled to face front and are equipped with solderless connectors that take a vice grip on solid or stranded wire, or both, or wire of different sizes.

Overload Indicator

(6) Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

A load indicating device that gives a log of overload performance is now available on the manufacturer's conventional distribution transformers. This type PL indicator utilizes a bimetallic thermostat embedded in the transformer winding to give an accurate indication of copper temperature.

An excessive overload turns on a red signal light that is visible from the ground and registers the overload on a dial. When the coil temperature falls below the danger point, the red light goes out but the dial pointer remains in position to indicate that an overload has occurred. This sequence is repeated for five overloads, after which the dial continues to count the overloads but the red light stays on to indicate potentially dangerous conditions and possibility of a burnout. A reset button makes it possible to turn the light off and return the dial to zero.

For Additional Information on These Products Fill in Coupon on Page 64

Square Recessed Downlight

(7) Pittsburgh Reflector Co., 406 Oliver Bldg., Pittsburgh 22, Pa.

When installed, this unit recesses into the ceiling, except for the one-piece, die-cast hinged frame. Hinges and latch are concealed. Slightly rounded contours are designed to flow into the ceiling line. Internal baffles prevent light leakage around the frame. Units are shipped completely packaged, wired and ready to install. Concentrating and extensive Corning lenses and a Corning lensed bowl are available to give a wide range of applications. Details in data sheet DL-300.

Infrared Meter for Radiation Work

(8) General Electric Co., Meter and Instrument Department, Schenectady 5, N. Y.

An infrared meter designed to measure radiant energy intensities up to 10 w per square inch is said to be especially suited for determining in a matter of seconds the intensity of high-range, radiant energy sources and for studies of infrared radiation effects concerning absorption and transmission properties of materials. Typical applications include determination of drying lamp field distribution, aiding in quality control of products that require infrared processing and in experimental studies and analysis of paint-baking ovens. It will also be used in advanced educational and medical work.

Designated type DW-69, the instrument is pocket-sized, inexpensive; its operation simplified because no separate thermopile or other accessory equipment is needed.

The radiation receiver is a sensitive thermocouple especially designed for radiation work. Because of a thin thermo element, which provides rapid response, the meter need be exposed for only a few seconds when making measurements, it is stated.

The meter is enclosed in a black Textolite case. Accuracy is plus or minus 5% of full-scale value over a response range of 300-3,500 millimicrons.

Allis-Chalmers Announces the *Pneu-draulic* Operator for Power Circuit Breakers

Operator combines advantages of Pneumatic and Hydraulic Operation, *sets new standards in reliability*

FOR THE FIRST TIME the inherent reliability, simplicity and low maintenance of hydraulic operation are combined in one circuit breaker operator with the proven high speed advantages of pneumatic operation.

Tests on the largest breaker ratings have recorded 15-15-15 cycles repetitive reclosing, three successive reclosures within 45 cycles... and have proved the possibility of even faster operation if needed. In addition to high speed reclosing, there are many other important advantages in the new design:

- Full mechanically trip-free operation for positive circuit interruption under all operating conditions.
- Positive high speed contact closing. Power is applied to breaker mechanism through direct acting operating piston.
- Sealed fluid system free from moisture and dirt problems.
- Operating characteristics unaffected by temperature change.
- Manual pump will provide power for breaker maintenance operation at full speed or at completely controlled speed. Complete installation and test can be made without control power.
- Minimum of 5 closings from stored energy or by hand pump.

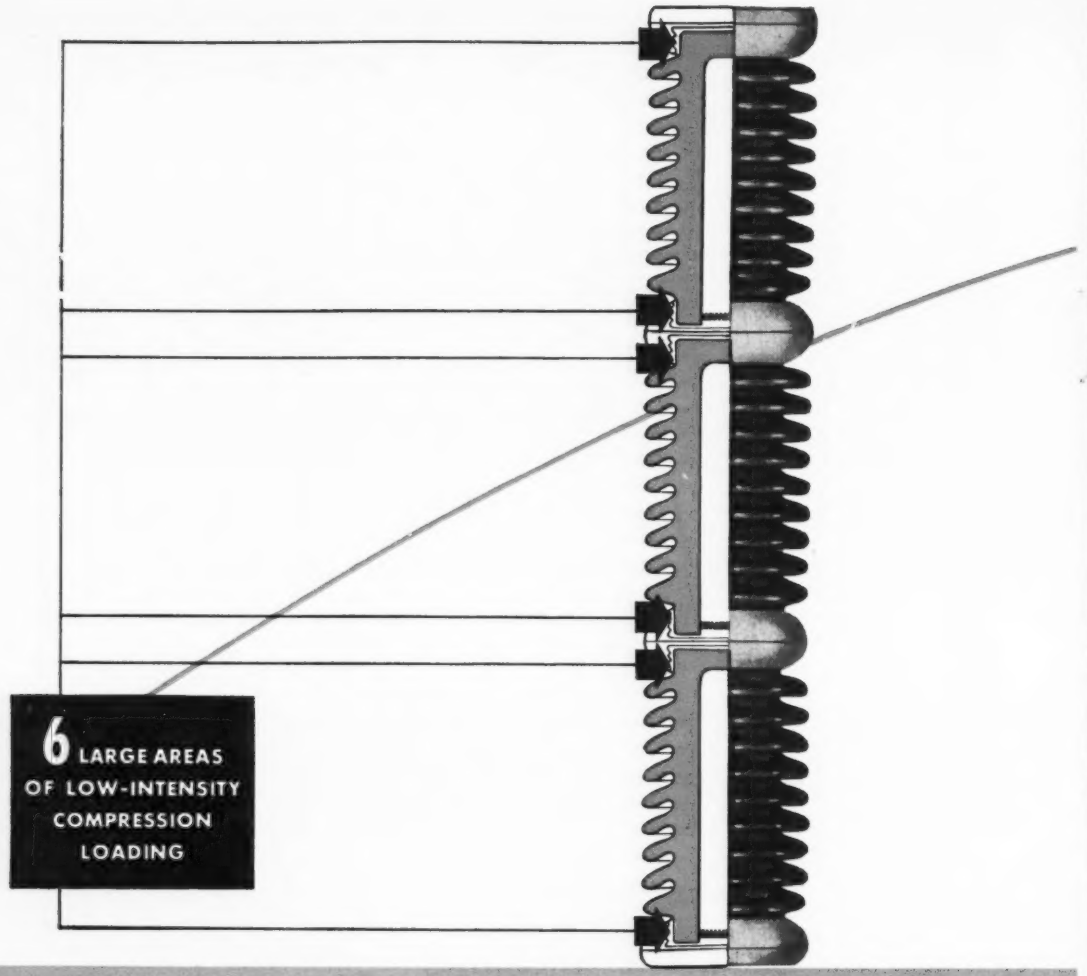
First applications have been made to the three cycle outdoor power oil circuit breakers rated 115 kv up with interrupting capacities of 5000 mva to 10,000 mva.

An Allis-Chalmers engineer will be glad to discuss the *Pneu-draulic* operator with you. Call your nearby A-C district office, or write for Bulletin 71R7914, Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3942

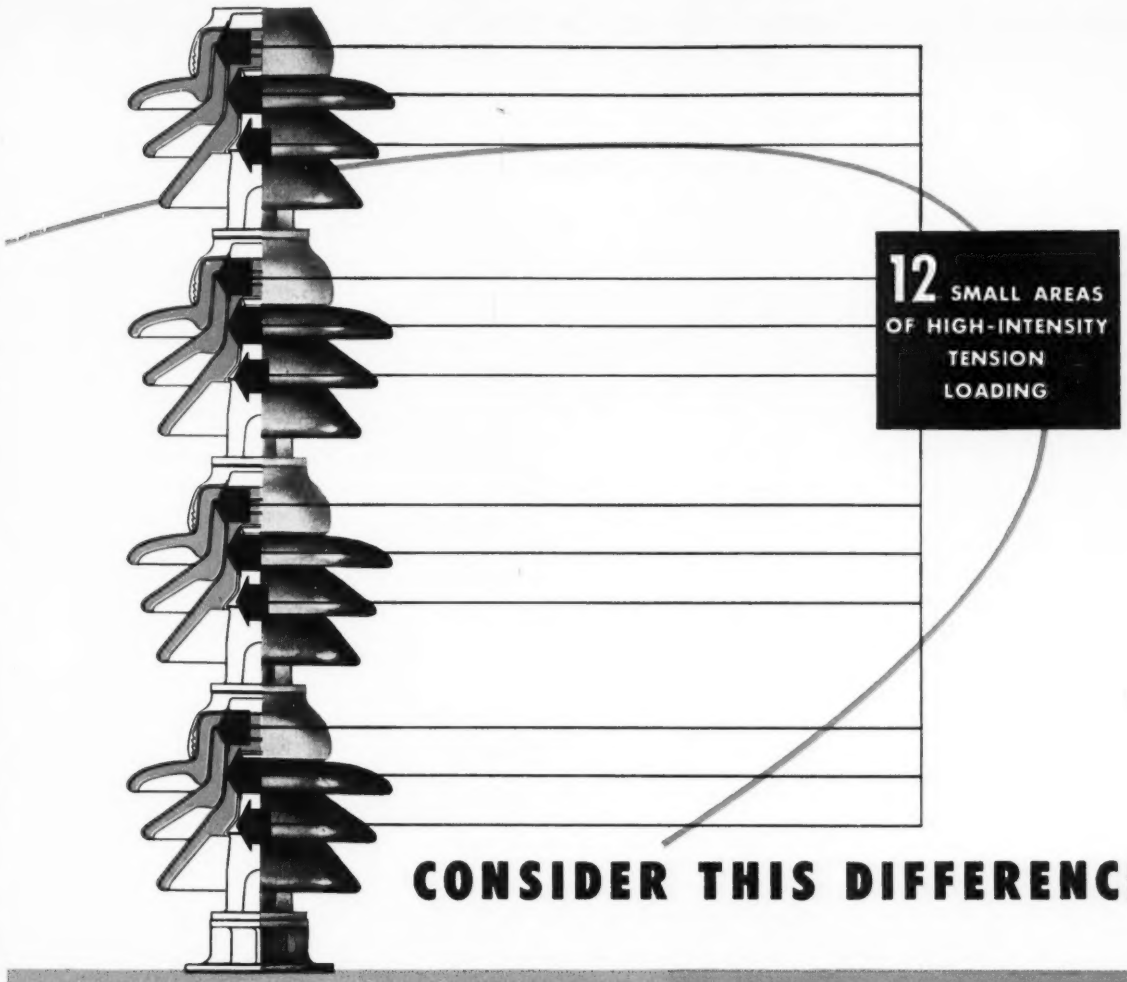
Pneu-draulic is an Allis-Chalmers trademark.

ALLIS-CHALMERS



Lapp

LAPP INSULATOR COMPANY, INC., LE ROY, NEW YORK



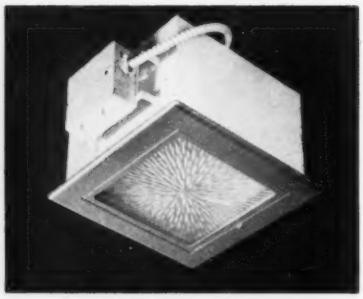
CONSIDER THIS DIFFERENCE...

. . . BEFORE YOU ACCEPT ANY SPECIFICATION FOR ANY SWITCH OR BUS SUPPORT INSULATOR

There are important differences between the Lapp Station Post and a conventional multi-part pin-and-cap station insulator—a difference in appearance—a bigger difference in how they work. For switch and bus support, mechanical security is fully as important as electrical characteristics. Rigidity and permanence under stresses from thermal change, tension, cantilever and impact, depend on security of mechanical loading within the insulator. In the Station Post design, Lapp recognizes that porcelain is approximately 10 times as strong in compression as in tension. This advantage is utilized in building the Station Post with hardware externally attached. In the corresponding units sketched above—a Lapp Station Post and a NEMA Standard pin-cap assembly—for duty at 138-161 kv, *compare* the *six* cemented joints of the Lapp Station Post, which can load porcelain only in compression, with the *twelve* nested shells of the pin-cap unit, each an area of loading which depends on tension strength of the porcelain. Isn't the Station Post superiority evident as a simple engineering conception? It's just as evident in operating security . . . in length of life . . . in elimination of outages . . . in cost of maintenance.

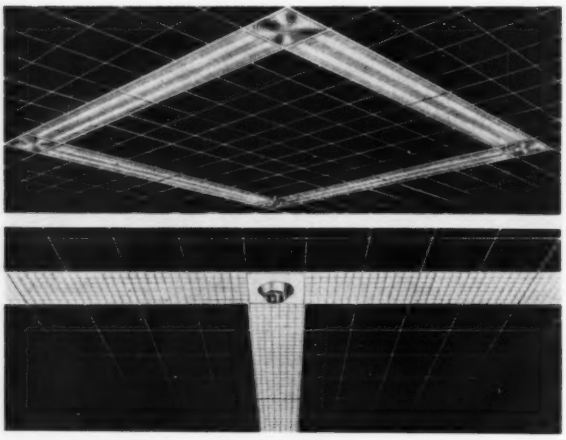
Recessed Incandescent Lighting Fixture

(9) Sunbeam Lighting Co., 777 E. 14th Place, Los Angeles 21, Calif.



Designed to give controlled illumination in stores, restaurants, offices and other areas in which moderately high levels of warm-tone lighting are required, these units incorporate Holophane Controlens. Lens frame and outside trim are made of one-piece, heavy-gage, die-formed steel with no welded joints. They are finished in silvertone. The drop-type hinged bottom lens panel opens by gravity when the finger-tip control latch is released and it locks automatically when closed.

Various models are available. Shallow and deep units have been designed to take 8½- and 12-in. lenses for widespread distribution pattern and from 150- to 300-w incandescent lamps. The shallow unit uses a specular metal reflector and the deep unit has a prismatic reflector that works in conjunction with the bottom lens. All units may be ordered unwired or prewired with junction box and have ample knockouts for various wiring requirements. Available are such features as night lights, top servicing, tamperproof enclosures and plaster frames, according to the manufacturer.



Commercial-Type Lighting Fixtures

(10) Sylvania Electric Products Inc., 1740 Broadway, New York, N. Y.

Fluorescent lighting fixtures of different lengths can be joined to give the appearance of a continuous sweep of light. Designed for schools, stores and offices, the recessed troffer line consists of 1-, 2- and 3-lamp fixtures available with six different types of shielding (four glass, two plastic) and four incandescent spotlight fixtures.

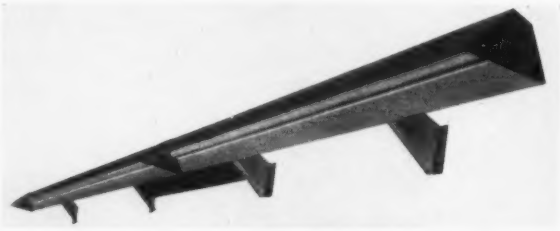
Lengths range from 2 to 8 ft for single mounting or any desired length for continuous rows. The units can be installed in shallow-ceiling areas.

The fluorescent fixtures come with either standard-start or instant-start lamps. The louver and directional incandescent spotlights are designed for use with 150-w PAR-38 lamps and the albalite and glass lens incandescent spotlights for 100-150-w inside-frost lamps.

Shallow Surface Luminaire

(11) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

Type SC luminaire is 3 5/16 in. deep; comes in 4-, 6- or 8-ft lengths and two- and four-lamp widths. It can be used for a variety of slimline and standard fluorescent lamps, and may be mounted in rows or individually. Translucent side panels eliminate sharp contrast between bright luminaires and dark ceilings by emitting some light toward the ceiling. The hinge-down louvers provide 35° shielding crosswise and endwise. The unit uses the new lead-lag ballast. Although designed for low ceilings, it can be suspended in higher ceiling areas.



Lighting for a Chalkboard

(12) Fluorescent Fixtures of California, 3320 18th St., San Francisco, Calif.

Designed to give good illumination at top, center and chalk-ledge levels of the chalkboard, this fixture comes in basic lengths of 48, 72 and 96 in., all with the same cross section to permit end-to-end rows. Fixtures mount on special brackets flush with top of surface to be illuminated. Interior is finished in high-reflectance baked white enamel; exterior is prime coated to permit matching color schemes. The unit is suggested also for display and bulletin boards, paintings, posters, signs and other vertical surfaces requiring illumination.

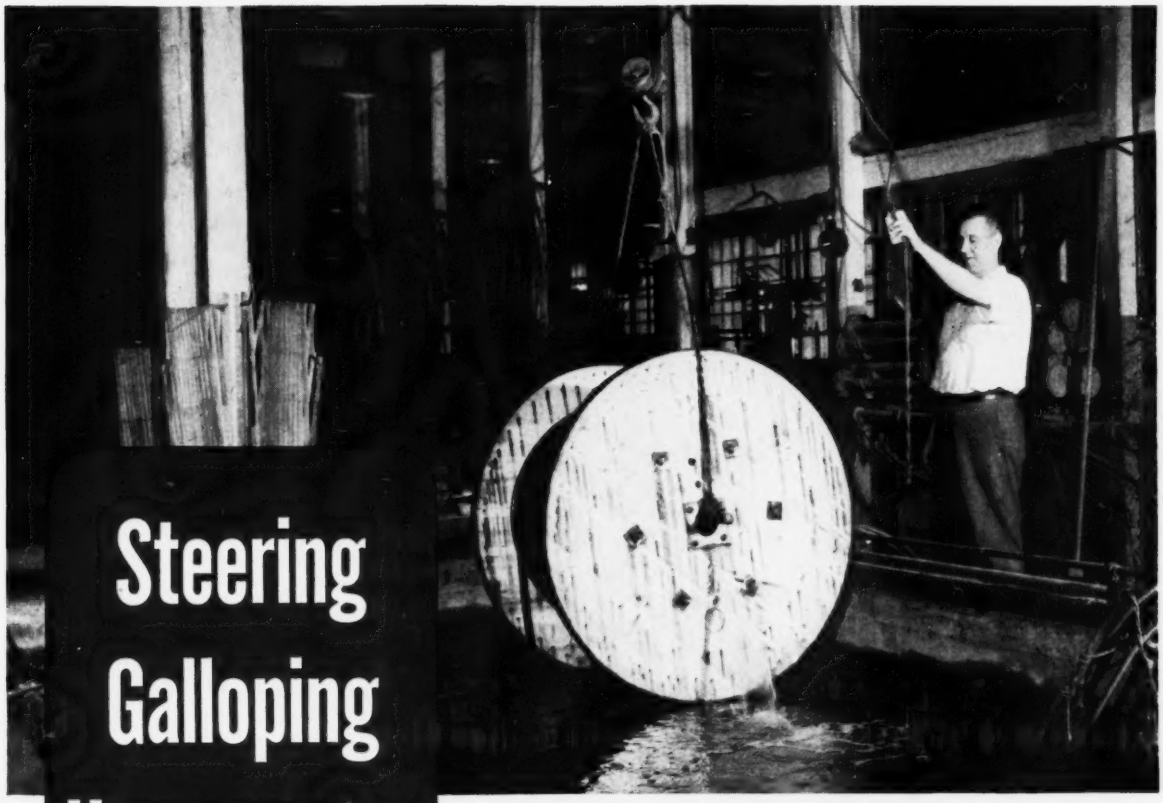
Flood Lamp

(13) General Electric Lamp Division, Nela Park, Cleveland 12, Ohio

A 300-w PAR-56 flood lamp of the all-glass sealed-beam type has been developed as a companion to the spotlight of the same size and type introduced in 1950. It has a medium-spread beam designed on the principle of the automobile headlamp. Prisms in the 7-in. lens cause a sharp cutoff of the beam, reducing spill to a minimum.

Suggested applications include outdoor use in service stations, sports areas, parking lots, building floodlighting and protective lighting; indoor use for show windows, displays, stages and exhibits. When installed outdoors, a housing should be used to protect the bulb. Base is of the mogul end-prong type.

For More Data Fill in Coupon on Page 64



Steering Galloping Horsepower

Telemetering, supervisory control and switching functions cannot be left to cables whose performance rating is just "so-so." These functions require cables with constant day-by-day dependability and the physical and electrical stability to stand up to all kinds of arduous operating conditions. Human lives as well as valuable property depend on proper functioning of these cables regardless of operating conditions.

Illustrated above is just one more example of the numerous tests that all ANHYDREX Supervisory Control Cables must successfully pass. All ANHYDREX Signal and Control Cables are extremely resistant to sunlight, weather, soil acids and alkalies, vibration and water. They are guaranteed not to absorb more than 20 milligrams of water when soaked for seven days at 158° F. (70° C.).

These cables are electrically stable with high dielectric strength, low power factor, and low dielectric constant. Even after prolonged submersion in water, these features are retained indefinitely. ANHYDREX Signal and Control Cables have no lead sheaths to crystallize or corrode. Their neoprene jackets are not subject to electrolysis nor harmed by vibration.

Specify ANHYDREX Signal and Control Cables. Their light weight and small diameter make them easy to handle, splice and terminate. For more complete information, contact your nearest Simplex representative or write to the address below.

Simplex WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Massachusetts

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Amp-trap®
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Here are just a few of those who use Amp-trap to prevent the development of heavy short-circuit currents. Lightning fast Amp-trap with its Interrupting Rating of 100,000 Amperes R.M.S. at 600 Volts and below, saves them money. It provides complete and positive short-circuit protection at lowest cost and permits the safe, quick and economical expansion of existing power circuits. It will pay you to investigate Amp-trap. Write for Amp-trap bulletin and ask for prices.
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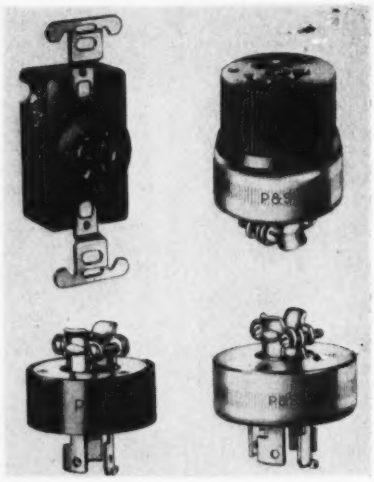
FUSE WIRE



Locking Wiring Devices

(14) Pass & Seymour Inc., Syracuse 9, N. Y.

The new Turnlok line includes 2-, 3- and 4-wire receptacles, caps and connectors with 10- and 20-amp ratings. Receptacles and connectors feature contour-controlled contacts, assuring positive contact at all times, and modern face design with rating plainly visible. Receptacles have two-piece bodies and plaster ears; are designed for back or side wiring. Heavily armored caps and connectors have large head binding screws and ample wireways for quick, easy wiring, the manufacturer states.

Insulating Resin

(15) Dow Corning Corp., Midland, Mich.

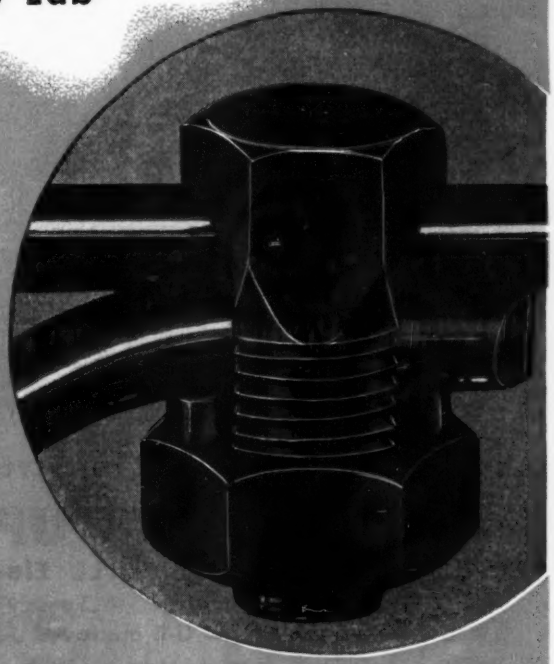
Silicone varnish 994 is designed for coating glass cloth and sleeving and bonding mica-glass combinations. Initial dielectric strength is in the range of 1,600 to 1,900 v per mil and 65% of this strength is still retained after 2,000 hours at 250 C, according to the manufacturer. Tests made according to ASTM D115 indicate that craze life of 994 is in the range of 3,000 hours at 250 C and 800 hours at 300 C. Flex life under the same conditions is in the range of 1,000 hours.

(16) TOGGLE SWITCH — For residential use, Eagle Electric Mfg. Co. Inc., Long Island City 1, N. Y., is marketing a single-pole toggle switch No. 784, available with plaster ears in brown or ivory. It is rated at 10 amp, 125 v; 5 amp, 250 v. Listed by UL and CSA.

For More Data
Fill in Coupon on Page 64

Startling new connector performance...

from the Chemistry Lab



Here's News!... BLACKBURN has perfected an amazing new and exclusive chemical process—the CFC Process*—which drastically reduces thread friction... Result—over 25% increase in clamping force, to make the outstanding BLACKBURN Connector even better.

Tests show that high pressure connections on copper conductor have lower resistance—stay tighter—and give you lasting, trouble-free service.

This new discovery means that every BLACKBURN Hi-Strength Connector for copper connections *makes* and *holds* a *maximum-pressure* connection—an absolutely dependable connection that will stay tight and trouble-free year after year.

**CFC Processed for improved high-pressure connections*

**Chemical Friction Control Process—Patent Pending*

BLACKBURN *Hi-Strength* CONNECTORS

GENERAL ELECTRIC SUPPLY COMPANY

A DIVISION OF GENERAL ELECTRIC DISTRIBUTING CORPORATION

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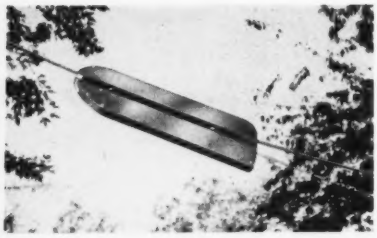


Wire Creeper

(17) Martindale Electric Co., 1306 Hird Ave., Cleveland 7, Ohio

Where one wire is in place, this wire creeper enables linemen to string additional wire through trees, over buildings, across ravines. According to the manufacturer, the creeper is placed on the wire and by means of pulling and releasing the plastic cord attached to it, the operator moves it away from him and along the wire in 10- to 20-ft leaps from one pole to the next in less than a minute (trees slow the operation slightly). When the creeper reaches the next pole, the new wire is pulled across by means of the plastic cord.

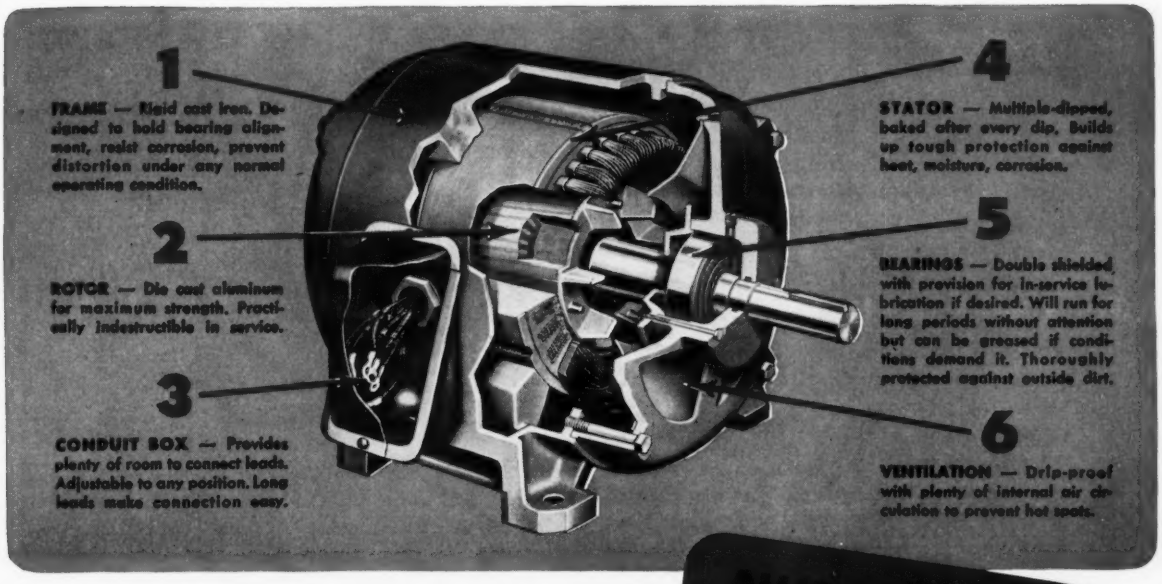
Line splices and frayed insulation are said to be no problem for the creeper, which will travel up steep inclines and through twigs and foliage of surrounding trees. For night work, a luminous bottom permits the operator to follow progress closely.

(18) MOTORS—Electric Motor Corp., Division of Howard Industries, Racine, Wis., is offering a new motor model 4400 for fan duty in refrigeration and air conditioning applications and a new model of the 700 motor, now known as 710. The 4400 is a shaded-pole motor and comes in three stacking lengths for various output power ranging from 1/25 to 1/11 hp. The 710 is designed for use as a blower or fan motor for refrigeration space cooler or space heater applications; is series wound and available in a-c or d-c; comes in voltage ranges of 6, 12, 24, 32 to 115 v.

(19) METER—The Metameter Telemeter can be used in taking remote readings of atmospheric temperature in connection with weather observation, according to the Bristol Co., Waterbury 20, Conn. Temperatures are measured at the remote point and the readings transmitted over a pair of telephone wires to a recording receiving instrument located at the observation site. The recorder chart tells the observer what the temperature is at the remote point, what it has been for the past several hours and its trend.

(20) MOTOR CONTROL—Arrow-Hart & Hegeman Electric Co., 103 Hawthorn St., Hartford 6, Conn., has added the RA-V magnetic motor starter to its line of right angle motor controls. The new development features vertical overloads below the contactor and is designed especially to be used with the new Crouse-Hinds M52, type EPC explosion-proof Condulet.

Look for These 6 Signs of Good Motor Design


1
FRAME — Rigid cast iron. Designed to hold bearing alignment, resist corrosion, prevent distortion under any normal operating condition.
2
ROTOR — Die cast aluminum for maximum strength. Practically indestructible in service.
3
CONDUIT BOX — Provides plenty of room to connect leads. Adjustable to any position. Long leads make connection easy.
4
STATOR — Multiple-dipped, baked after every dip. Builds up tough protection against heat, moisture, corrosion.
5
BEARINGS — Double shielded with provision for in-service lubrication if desired. Will run for long periods without attention but can be greased if conditions demand it. Thoroughly protected against outside dirt.
6
VENTILATION — Drip-proof with plenty of internal air circulation to prevent hot spots.

Get Allis-Chalmers Motors for these Extra Values!

MOTORS

Certified Service — Nearly 100 Allis-Chalmers Certified Service Shops provide factory-approved parts and service on your Allis-Chalmers motors. Screened for modern equipment, adequate experience and business integrity, these independently owned service shops will provide you with prompt, economical repair and maintenance.

Complete Drives from One Source — Allis-Chalmers can supply your complete drive — motor, control and *Texrope* V-belt drive — from one convenient, reliable source.

Application Engineering — Your Allis-Chalmers District Office representative or Authorized Dealer will be glad to help you select exactly the right motors for your needs. For additional information, write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B6052. A-3954

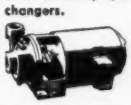
Texrope is an Allis-Chalmers trademark.

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Distributors, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE V-belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.



PUMPS — Integral types from ¾ in. to 72 in. discharge and up.

ALLIS-CHALMERS

Your costs go down all along the line when you specify

Rome Aluminum

Whether it's secondary and service drop cable or weatherproof wire for primary circuits, you get a host of cost advantages with Rome Aluminum.

Low installation and maintenance costs

You can string longer spans with fewer poles because its mechanical design and light weight reduce sag tendencies. It gives you greater protection against wind and ice loading. It reduces tree trimming and cuts labor costs during installation.

You need fewer accessories for secondary and service drop cables because of Rome Aluminum's Triplex construction. This also assures a neater, cleaner installation.

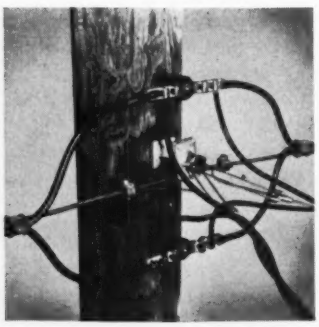
Maintenance costs are down, too. Conductors are easily accessible because Rome Triplex requires no common covering.

Long service life

And you can count on long service life. Aluminum itself is a long-life conductor material. RoPrene (Neoprene) and RoLene (polyethylene) insulation have exceptional resistance to weather and abrasion. Replacement is minimized. There are no braids to rot or festoon.

Take advantage of the savings inherent with aluminum itself . . . and the results of years of exhaustive research and testing by technically skilled, progressive Rome engineers. Ask your Rome salesman about Rome Aluminum on his next visit.

Light weight of Rome Aluminum Triplex permits easy installation, cuts labor costs, reduces sag, minimizes ice loading.



Here is a typical service tap connection at the pole . . . only one of several types of connections which can be made.

Dead end formed around bare neutral messenger of Rome Aluminum Triplex make house connection. Also meets industry requirements.

Triplex Self-supporting Secondary and Service Drop Cable

Regularly supplied with stranded or solid all-aluminum power conductors, insulated with RoPrene (Neoprene) and ACSR or other suitable bare neutral messenger. All-aluminum, copper or copperweld messengers are also available. RoLene (polyethylene) insulation can be supplied in place of RoPrene.

Weatherproof Wire

Regularly supplied with solid or stranded all-aluminum or ACSR conductors, covered with RoLene or RoPrene. Conventional URC triple braid covering can be supplied.

It Costs Less to Buy the Best

Rome ALUMINUM

ROME CABLE CORPORATION, ROME, N.Y., AND TORRANCE, CALIF.

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SPECIFY PROPER
OHIO
BRUSHES FOR YOU

Every motor or generator you have purchased or will purchase is an example of precise workmanship when it is delivered to you. Its efficiency of commutation, however, depends upon proper application to the load and surrounding conditions in the area in which it operates. Our engineers have made exhaustive studies on this subject and are qualified to make the proper recommendations, at no obligation to you, should any motor in your plant fail to give "peak" performance or respond properly under long and continuous usage.

ORDER YOUR CARBON BRUSHES FROM A SINGLE SOURCE

West Coast Representative
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544 S. San Pedro St.
Los Angeles 13, Cal.

THE OHIO CARBON COMPANY
12508 BEREA ROAD • CLEVELAND 11, OHIO

Masonry Drill

(21) General Electric Co., Carboloy Department, Detroit 32, Mich.

A drill that automatically cleans dust particles out of the hole it makes eliminates possibility of jamming, the manufacturer states. The self-cleaning action is from the shallow, oval spiral and overhang on the tip, which keeps the particles moving out of the holes.

Octal Sockets

(22) Sylvania Electric Products Inc., 1740 Broadway, New York, N. Y.

Octal sockets designed to specification JAN-S-28A are available with either grade L-4B or better ceramic insulating base or with type MFE low-loss phenolic plastic insulation. Mounting saddles are brass nickel plated with four ground lugs hot tinned for solderability. Saddles come with .156 diameter mounting holes or with threaded extrusions for 6-32 screws. Contacts are available in phosphor bronze or beryllium copper, silver plated. They are hot tin dipped after assembly for better solderability.

Portable Oven

(23) Grieve-Hendry Inc., 1815 W. Lake St., Chicago 12, Ill.

An eight-compartment portable electric oven allows for separation of different sizes or types of products while drying, baking or preheating. One application is for moisture stabilization and storage of welding electrodes. The oven has adjustable temperature control to 325 F; operates from 110-v a-c outlet; has fan-driven forced circulation of air; adjustable damper for temperature control. Oven is 30x25x 24 in., outside dimensions.

(24) WORK TABLES — Designed to integrate operations of work-handling equipment with the new 25-kw RF generator, this line of work tables incorporates the control circuits that are necessary for automatic or semiautomatic induction heating operations. A transfer switch is used for applications requiring constant switching of power from one work position to another. Quench plumbing is built into the table. Available from Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

(25) SWITCH — A 20-amp switch for controlling heavy loads in industrial and commercial electrical service has been added to the Levolier line of McGill Mfg. Co. Inc., Valparaiso, Ind. This model 2020 is a universal lever-operated pull switch with a-c and d-c rating. Two inches wide and 1¼ in. thick, it will carry 2,500 w at 125 v safely, the manufacturer states. Meets UL requirements.

Power and Lighting Transformers

(26) Burton Equipment Co. Inc., 4810 Firestone Blvd., South Gate, Calif.

This new line of type EM transformers for power and lighting circuits comes in all standard voltages 600 v and below, with ratings from 50 va through 3 kva. The 3-kva transformer, shown in the illustration, is Class B insulated (80° rise) and all other sizes are Class A insulated (55° rise).

Features include a roomy connection box, with knockouts that match standard gutter boxes to simplify installation and wiring. These units are made to conform with UL requirements. Available now are 1, 1½, 2 and 3 kva and 500 and 750 va units. The remaining sizes, 50 through 250 va, will be available about April 1, the manufacturer states.

(27) WINDOW FAN — The 1953 Portabout Atlas-Aire home window fan is lighter in weight, includes a 20-in. in addition to the 10-, 12- and 16-in. models. It serves as an exhaust fan to blow out air, as an intake fan to draw in air, or may be removed from the frame for use as a portable circulator fan. Made by Atlas Tool & Mfg. Co., 5147 Natural Bridge Blvd., St. Louis 15, Mo.

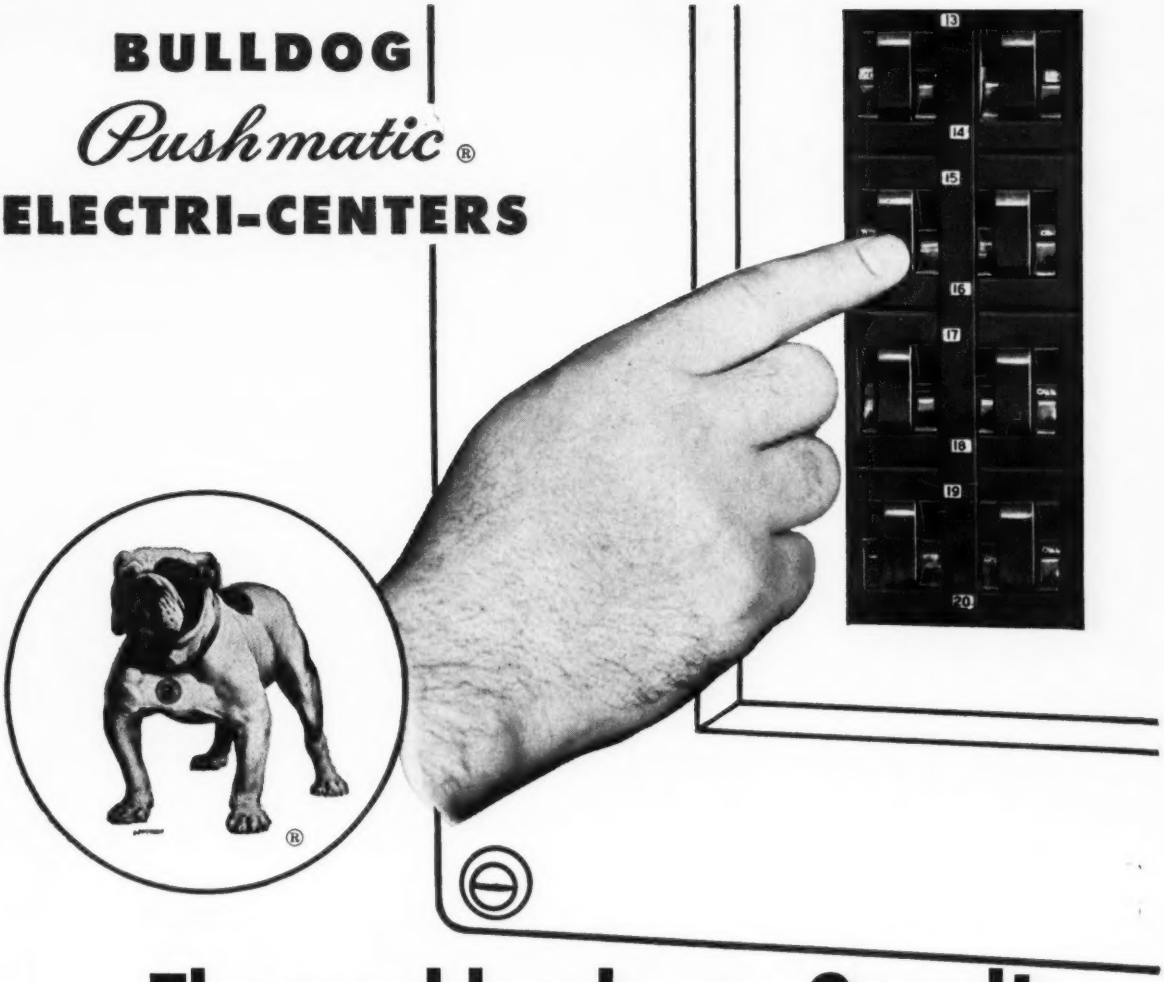
(28) ADDING MACHINE—Figures add and print automatically as they are entered on the keyboard of the new electric adding machine offered by National Cash Register Co., Dayton 9, Ohio. When the amount is set up, the figure adds and prints, because every key is its own motor bar.

For Bulletins, Fill in the Coupon on Page 64

BULLDOG

Pushmatic ®

ELECTRI-CENTERS



Thoroughbreds on Guard!

The clean, neat exterior of BullDog Pushmatic Electri-Centers is truly indicative of their thoroughbred quality and safe, dependable operation.

Only Pushmatics give you simple-to-operate push-button control. On guard over electrical equipment like a row of sentinels, Pushmatics let you easily see whether the circuit is on or off. When a short or overload occurs, the push-button snaps forward, automatically breaking the circuit, and word "OFF" appears. Once the trouble has been remedied, simply *push the button,* and service is instantly restored.

BullDog Pushmatic Electri-Centers are available in sizes from 2 to 42 circuits, to fill every industrial, commercial or home requirement. Write today for free Bulletin PM-355 giving complete information. BullDog Electric Products Company, Dept. EW33, Detroit 32, Michigan.

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San Francisco 3, California

BullDog Electric Products of Los Angeles
P. O. Box 7385, Lugo Station
Los Angeles 23, California

Young Electric & Manufacturing Company
2134 Curtis Street
Denver 2, Colorado

Dig into this Fabulous Westinghouse

ASK YOUR DISTRIBUTOR HOW YOU CAN GET ABSOLUTELY FREE

- $79.95 Mobilaire® Fan *Absolutely Free*
- Mobilaire Ice-Cake Display *Absolutely Free*
- $9.95 Hostess Tray for each 16-inch Debonaire Fan *Absolutely Free*
- Selling Helps Package *Absolutely Free*

No buried treasure, this—but profits *plus*. Here's the all-out answer to the public's clamor for the best in hot weather fan performance . . . here's your new '53 Westinghouse line, biggest and best ever *by far*.

Here's the amazing all-new, 4-way, Reversible Riviera Window Fan. Also, the ever-popular Mobilaire, the "Fan on Wheels". *Plus* 16 other top performers . . . every one super-styled and priced *right* for mass turnover.

Last summer's blistering weather lost many a retailer, many a fan sale . . . when stocks ran out. So get set *now* for the months ahead! Line up with your distributor on the sales-multiplying Treasure Chest Sales Plan . . . and stock '53 Westinghouse Fans *aplenty* for the rush coming up!

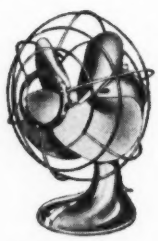
WESTINGHOUSE ELECTRIC CORPORATION
Electric Appliance Division, Springfield 2, Mass.

YOUR BIG

16MA3—16-inch Mobilaire® . . . 2-Speed, Double-Duty Exhaust Fan.

PLUS THESE

10LA4—10-inch Livelyaire* . . . 1 Speed; 12LA3, 2 Speed; both oscillating.



10PA2—10-inch Poweraire® . . . 2 Speed; 12- and 16PA2 . . . 3 Speed; all oscillating.

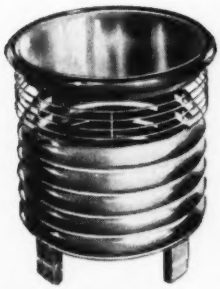
*T.M.

You can be SURE... if it's WESTINGHOUSE

Treasure Chest!

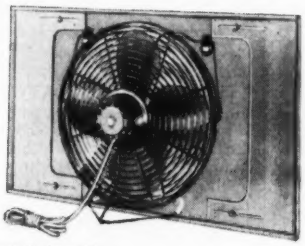
PROFIT LINE . . . BIG COOLING FANS

16RWF—16-inch Riviera . . . 2-Speed, 4-Way Reversible Window Fan.

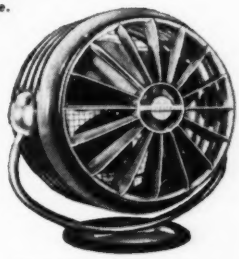


16DA2—16-inch Debonaire . . . 2-Speed, Hassock Type.

Whirlaire®—16- and 20-inch . . . 2-Speed, Long-Range Circulators.



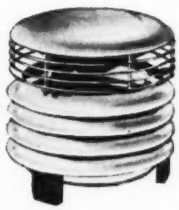
16WF2—16-inch De luxe Window Fan . . . 2-Speed, Snap-In, Snap-Out Window Fan.



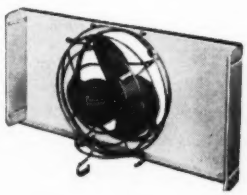
Whirlaires—16- and 20-inch . . . 2-Speed, Long-Range Circulators.

POPULAR MODELS THAT SELL . . . SELL . . . *SELL!*

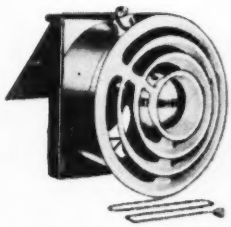
16SD3—16-inch Standard . . . 3 Speed; oscillating.



10DA2—10-inch Debonaire . . . 1 Speed, Hassock Type.



10PWV2—10-inch Poweraire . . . Snap-In, Snap-Out Window Ventilator.



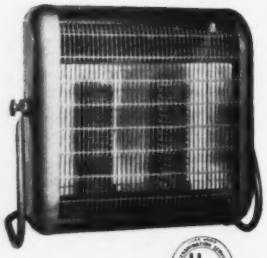
10PHV—10-inch Poweraire . . . Built-In Home Ventilator.

Modern Automatic heating at its finest..

MEMO: extra profits for electricians too!

A REAL SALES OPPORTUNITY FOR ELECTRICAL JOBBERS IN THE WEST

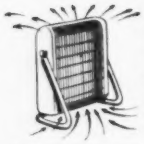
• Now you can offer your dealers outstanding products . . . consumer acceptance has been rapid—sales have jumped by leaps-and-bounds. Meier Nu-Air Wall and Portable automatic furnaces are beautifully designed and have the highest quality construction for "tops in sales appeal"



PORTABLE FURNACES FOR DIRECTED HEAT

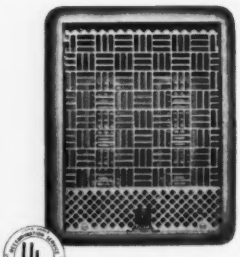
Fully Adjustable
Adjustable over wide radius so that heat may be directed up or down at will.

THERMOSTATIC CONTROLLED AUTOMATIC HEAT



Radiates and Circulates
In addition to the radiant heat from the bright copper-clad reflector the Meier Nu-Air unit gives even, warm air circulation at the ideal velocity for quiet comfort.

A Size for Every Need . . . 5 Models!



SPECIAL FEATURES OF MEIER AUTOMATIC WALL FURNACES

Thermostatic Control
Built-in, sensitive thermostat automatically maintains the desired temperature in any room. Just set and forget it.

Radiates and Circulates
Even, warm air circulation, at the ideal velocity of about 200 feet per minute, plus radiant heating, gives gentle, quiet comfort without cold drafts.

Maximum Safety
An added safety feature prevents removal of the grille unless the switch is in the "off" position.

Easy to Clean
The grille is easy to remove for complete cleaning. Smartly styled to eliminate all "dust traps".

Manufactured by
MEIER ELECTRIC & MACHINE CO., INC.
INDIANAPOLIS 7, INDIANA
Famed for Dependability EST. 1904 Throughout the World

TO: *The O. B. Wilt Co.*
Western Representative
1355 MARKET STREET
SAN FRANCISCO 3, CALIFORNIA
Please send me additional information on the Meier Nu-Air portable and wall-type automatic furnaces, and the availability of franchises in my trading area.

MY NAME: .....
MY COMPANY: .....
MY ADDRESS: .....

(29) TROFFER LINE—Four 20-w, 2-ft troffers in one-, two- and three-lamp models are included in the Uni-Flow fluorescent line introduced recently by Mitchell Mfg. Co., 2525 Clybourn Ave., Chicago, Ill. Matching downlights, measuring 12x12 in., come in a choice of three types. The new Uni-Hanger is a universal clamping arrangement that makes it possible to clip the troffer directly to either Tee-bar or steel purling ceiling members. It is claimed to cut troffer installation time by 50%.

(30) FIXTURE—A new surface-mounted fixture introduced by Leader Electric Co., 3500 N. Kedzie Ave., Chicago 18, Ill., is designed to give glareless light. It comes in 2x2, 2x4, 3x3, 3x6, 4x4 and 4x8 ft. Units may be used singly or together.

(31) INDUSTRIAL LUMINAIRE—Type SDP offered by Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa., is designed with an upward component to give greater seeing comfort. It uses two slimline lamps of 38, 58 or 75 w. The upward component distributes 23% of the light toward the ceiling.

(32) LAMPHOLDERS—A line of turret-type lampholders for single-pin and bi-pin fluorescent lamps in two- and three-lamp combinations has been announced by the lighting division of Sylvania Electric Products, 1740 Broadway, New York, N. Y. Five styles of single-pin and three models of bi-pin holders are available.

(33) BATTERIES—A new line of two- and three-cell industrial batteries in transparent plastic containers for stationary small power applications has been announced by the Electric Storage Battery Co., Box 8109, Philadelphia 1, Pa. These Exide-Tytex, type COE batteries are claimed to combine highly sustained useful voltages and long trouble-free life with reduced operating and maintenance costs.

(34) ROOF VENTILATOR—The Airjet, an automatic fan-powered roof ventilator, is offered by the Hartzell Propeller Fan Co., Piqua, Ohio. Two hinged aluminum panels form a weathertight peak roof. They open automatically when the fan is started, close when it stops. When they are open, the air stream prevents entry of rain or snow, the manufacturer states.

(35) PUSH BUTTON—A push-button switch measuring 1.047 in. from end of plunger to end of terminal tips, with ½ in. diameter at its widest point, has been announced by Grayhill, 4524 W. Madison St., Chicago 24, Ill.

(36) ATTIC FAN—A new lower-priced model has been announced by Hunter Fan & Ventilating Co., 400 S. Front St., Memphis, Tenn. This fan requires only 18-in. attic clearance, a ceiling opening and adequate exhaust areas. It comes in three sizes: 24-in. fan, 5,000 cfm; 30 in., 7,000 cfm; 36 in., 10,500 cfm.

(37) DRIVE—A packaged-type multimotor slasher drive using magnetic amplifier control is available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. This drive is designed to give high efficiency, reduced maintenance and fine control of yarn tension during slasher process.

(38) TEST CLIP—The new Grayhill alligator-type test clip, series 16, is completely insulated; comes in red or black. Details may be secured from the manufacturer, 4524 W. Madison St., Chicago 24, Ill.

LOOK FOR THIS DISPLAY AT YOUR DISTRIBUTOR'S
Inspect the New SPANGLEAM finish
TEST THIS SAMPLE
Feel -ITS LIGHT WEIGHT -ITS STRENGTH -ITS SURFACE
CA-4
NOW SPANG EMT ...THIN WALL CONDUIT
SPANGLEAM
FINISH AT NO EXTRA COST !
INSIDE IMPROVED OUTSIDE
AVAILABLE IMMEDIATELY IN THE FULL RANGE OF 6 SIZES-½"-¾"-1"-1¼"-1½" and 2"
Easier to cut and bend ! ....faster to install !
SPANG CONDUIT

. . . now available—at no extra cost—on Spang EMT thin wall conduit!

Check These Points:

1. NEW FINISH OUTSIDE

. . . specially-processed electrogalvanized exterior . . . highly resistant to smudge, abrasion, corrosion . . . provides neat, attractive appearance in exposed installations.

2. NEW FINISH INSIDE

. . . new smoother protective coating of resinous lacquer compounded with Zirconium . . . provides easier wire pulling, assured grounding, corrosion resistance.

3. LIGHT WEIGHT—STRONG

. . . the same Spang top-quality EMT thin wall conduit . . . easy to cut, bend, install; built from high-grade steel for years of service in permanent installations . . . BUT, now with the SPANGLEAM finish it's cleaner, easier to handle, easier to maintain.

4. AVAILABLE

. . . SPANGLEAM finish is available immediately in the full range of six sizes—½", ¾", 1", 1¼", 1½" and 2".

LET SPANGLEAM HELP YOU

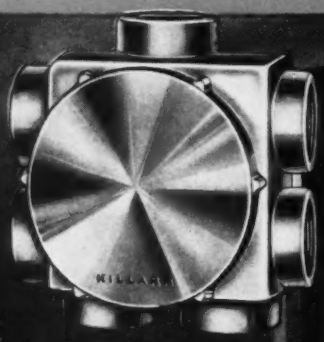
- make better installations
- make work easier
- build profits

TAKE A LOOK AT SPANGLEAM TODAY! THEN TRY IT!

SPANG CONDUIT

SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE:
PITTSBURGH 30, PA.
District Offices and Sales Representatives in Principal Cities

Mr. Contractor: Mr. Electrician:
YOU BUILD A LIFETIME REPUTATION



with LIFETIME KILLARK alumalloy Fittings & Fixtures

- **THEY'LL NEVER RUST**
- **THEY'LL NEVER CORRODE**

By specifying and installing *Killark* on every job, your own reputation as a contractor or wireman will live long after ordinary installations are no more than rusty memories.

Whether you're planning for the humid, rust-producing atmosphere of a laundry, dairy or packing house — an underground job — or the corrosive background of a petroleum refinery or chemical plant—your reputation is safe with Killark Alumalloy Fittings and Fixtures.

There are other quality advantages, too. Killark Alumalloy is safe, non-sparking . . . 60% lighter than iron . . . won't break under excessive strain . . . produces a satin-smooth finish inside and out, as well as clean-cut threads.

For a "brighter" future, for a permanent reputation, always specify KILLARK . . .

K KILLARK ST. LOUIS

Killark

"A FITTING NAME TO REMEMBER"

ELECTRIC MANUFACTURING COMPANY

Vandeventer and Easton Aves. — **St. Louis 13, Missouri**

SALES OFFICES and WAREHOUSE STOCKS	Atlanta	69 Mills Street, N. W.	Dallas	1901 Griffin Street	Philadelphia	2014 Chancellor St.
	Boston	156 Purchase St.	Denver	1073 Galapago	Pittsburgh	50 26th St.
	Buffalo	18 Quay St.	Detroit	8319 Mack Ave.	San Francisco	140 Spear St.
	Chicago	564 West Adams St.	Los Angeles	412 Seaton St.	Seattle	4130 First Avenue South
SALES OFFICES	Baltimore	11 W. 25th St.	Columbus	2700 E. Main St.	Minneapolis	924 Andrus Bldg.
	Cincinnati	49 Central Ave.	Kansas City, Mo.	616 W. 26th St.	New York	600 W. 181 St.

Styles for Every Mounting, Rating, and Phase Spacing

PACIFIC ELECTRIC AIR SWITCHES

7.5 to 230 kv

WHATEVER the installation conditions — or dictates of "standardization" — there's a Pacific Electric Advanced-Design Air Switch for every disconnecting or sectionalizing need. Pacific's originations* in the air-switch field have contributed notably to power industry progress.

*Send for Publication DS-195, "Design of Air Switch Contacts for Maximum Service."

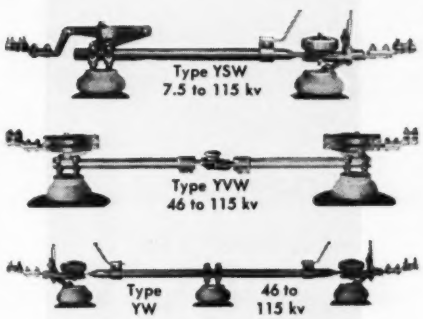
All switches on this page are NEMA and ASA Standard.

SIDE-BREAK TYPES

in three basic styles

Forty-four years ago Pacific made the first commercially used rotating-insulator side-break air switch (similar to Type YW at right —the Baum switch), and has improved this type and its successors ever since.

Today's Pacific side-break switches have full-floating twin-disk (or segment) roller-wipe silver-to-silver contacts with pressure applied by pre-loaded springs that carry no current. Used mostly on towers or structures.

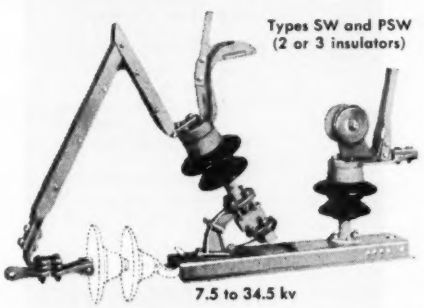


TILTING-INSULATOR TYPES

mostly for pole-top use

And forty years ago Pacific made the first commercially used tilting-insulator switch, and has continuously developed this type in several forms ever since.

Today's Pacific tilting-insulator switches have contacts similar to those used on side-break switches, described above, except the twin-disk rollers are on edge. Underhung counterbalanced interphase shaft and provision for hot-line cut-in are other features.



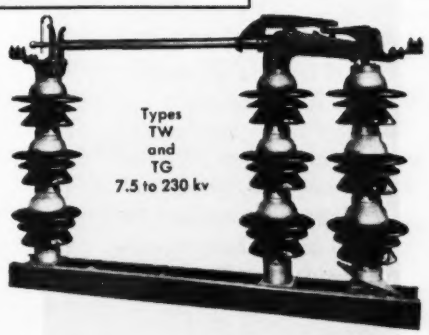
Ask for catalogs of any style of switch.

All switches are pictured as single-pole units. Switches comprise three such units plus operating mechanism and usual accessories.

"TWISTER" BLADE TYPES

Another important Pacific type, the "twister" blade switch with enter-turn vertical break, has undergone much development by Pacific since its manufacture was started 17 years ago.

These switches embody full-floating silver-to-silver adjustable high-pressure contacts applied by independently mounted pre-loaded springs (forks do not bend as springs). Simplicity of enter-turn linkage is another feature. Many ratings available without hinge-end jumpers.



PACIFIC ELECTRIC MFG. CORPORATION

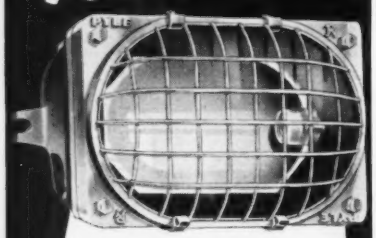
5815 THIRD STREET, SAN FRANCISCO 24, CALIFORNIA
Other Factories: Santa Clara, California; Gary, Indiana

Since 1906

SALES OFFICES or AGENCIES in PRINCIPAL CITIES

PYLE-NATIONAL

New



VAPORPROOF PIT and SUBWAY Floodlight

Another NEW addition to The Pyle-National Company's extensive line of industrial floodlights and lighting fixtures!

The Pit Light is especially designed to provide perfect lighting in maintenance pits, subways, tunnels, washracks, or other locations subjected to heavy moisture. Heavy-duty metal construction throughout, fixture can be recessed in, or surface mounted on either wall or ceiling.

Reflector can be pivoted to adjust the angle of beam upward or downward from center. Easily cleaned, heat and impact-resistant plain glass front reduces reflection losses. Reversible, hinged heavy wire guard — held closed by spring latches — is optional.

Write for Bulletin

SINCE 1897

THE PYLE-NATIONAL COMPANY

1364 N. KOSTNER AVE. • CHICAGO 51, ILL.

District Offices and Representatives in Principal Cities of the United States

PYLET CONDUIT FITTINGS • FLOODLIGHTS

BULLETINS ETC.

(39) RURAL PROGRAMS—A 12-page catalog (B-5864) of educational aids for power supplier rural programs is available from Westinghouse Electric Corp., School Service, Department T, Box 2278, Pittsburgh 30, Pa. The catalog describes materials for power suppliers to use in furthering 4-H, Future Farmers of America, Future Homemakers of America and other rural educational programs.

(40) FLUORESCENT LUMINAIRE—A 24-page catalog of fluorescent commercial and industrial luminaires is offered by Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. This booklet, B-5799, tells where respective types are best applied, what models are available, features and dimensions of each. A four-page table gives standard data on all the luminaires, with style number, description and price of each.

(41) PAPER BACKED TAPES—An eight-page booklet describing in picture-story style applications of seven Scotch brand paper-backed electrical tapes in electric motor, coil and transformer construction has been announced by Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul, Minn. It shows how purified crepe- and flat-paper tapes can be used to insulate motor field coils, to anchor lead wires and to insulate coil windings from the core; how purified paper tapes with thermo-setting adhesives can be used where higher temperatures are found, for greater resistance to heat and solvents.

(42) LIGHTING—Day-Brite Lighting Inc., 5411 Bulwer St., St. Louis 7, Mo., has issued catalog sheets and a binder index dated Jan. 15, 1953. The sheets cover Mobilex grid-type glass-enclosed, plastic-enclosed and hinged-louver units; CFI Day-Line units.

(43) SPLICING—How to splice its 6x19 class can conveyor ropes on the job is the subject of a new booklet issued by Bethlehem Pacific Coast Steel Corp., 20th & Illinois, San Francisco, Calif. The story is told in pictures. A splicing specialist set up his vise and wire ropes in front of a camera; step-by-step photographs were taken as he did the actual splicing; his explanations accompany the photos.

(44) CONTROL CENTERS—A 28-page bulletin featuring its multiunit control centers has been issued by the Allen-Bradley Co., Milwaukee, Wis. A complete explanation, from purpose to construction, is included as are unit dimensions and ratings and some typical applications. Layout charts and floor arrangements are illustrated to simplify planning. Ordering information is given.

(45) CIRCUIT BREAKER—Design and construction features of the Ruptair magnetic air circuit breaker arranged for installation in vertical lift switchgear rated 4.16 kv are described in a bulletin released by Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis. The booklet shows how the breaker interrupts short-circuit current and describes the purposes of the arc chute and the integrated contacts. A table of ratings and dimensions is included in this bulletin 18B6364B.

(46) SLIMLINE—A four-page folder describing its A.L.S. industrial slimline unit is offered by Smithcraft Lighting Division, Chelsea 50, Mass.

(47) BATTERY SEPARATORS—Features and performance characteristics of porous hard rubber storage battery separators are given in a catalog issued by the electrical wire and cable department of United States Rubber Co., Rockefeller Center, New York 20, N. Y.

(48) PARTS — Custom-molded nylon plastics parts are described in a four-page bulletin, CDP-654, offered by General Electric Co., Chemical Division, Pittsfield, Mass.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after May 1

Please send me, without obligation, the new product information or catalogs described on the following pages and identified by numbers circled below:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48

Advertising on page.... ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

NAME.....**TITLE**.....

COMPANY*.....

ADDRESS.....

CITY.....**STATE**.....

*Please include your company's name and your position, since we cannot ask manufacturers to furnish literature unless you do.

CLARK TYPE "CY" starters have

No **trick mounting problems**

No **crowded wiring spaces**

No **lack of concentric knockouts**

No **installation troubles**

No **parts back-removable**

No **tools needed for inspection**

No **loose screws in contact arm**

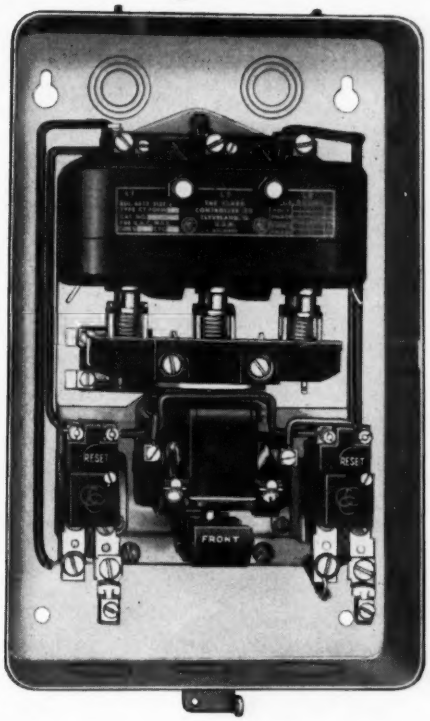
No **single-break contacts**

No **carbonizing in arc chamber**

No **overload difficulties**

No **burning in steel arc space**

No **openings in top of arc shell**



This string of positive *"NO's"* is supplemented by a long list of affirmatives that make CLARK Type "CY" STARTERS the ideal line for Distributors to stock.

Contractors installing CLARK Type "CY" STARTERS are building satisfied customers for repeat business when new installations are made.

So—when you buy, you'd better try **CLARK TYPE "CY"**

THE CLARK CONTROLLER CO.

ENGINEERED ELECTRICAL CONTROL • 1146 EAST 152ND STREET, CLEVELAND 10, OHIO

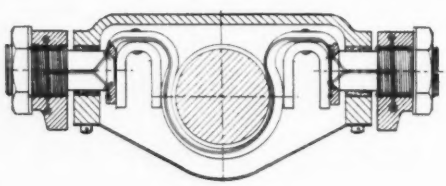
NEW CHANCE type H Rotating Stack Switch

For 7.5 through 230 KV 400-600-1200 Amperes

Switching operations on today's heavily loaded power systems demand rugged switches that are simple in design and have the ability to give years of unfailing performance—without maintenance—under any climatic condition.

Chance Type H Outdoor Group Operated Airbreak Switches meet these demands —they have only three moving parts . . . break heavy ice accumulations with ease . . . have high pressure contacts at both ends . . . completely enclosed hinge connection . . . permanently lubricated or dry type ball bearings and are equipped with universally adaptable controls for installation on any type of structure.

Chance Type H 7.5 to 69 KV Single Pole Design

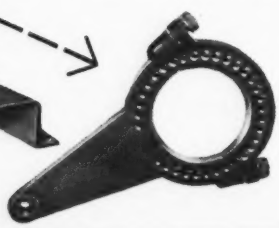


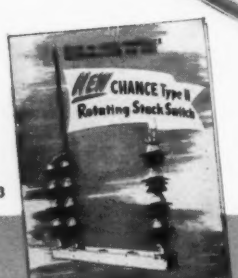
Continuous Hinge Contact

The contact at the hinge end of ALL Type H Switches is held under constant high pressure in both open and closed position. Contacts are never released—thus contact area is never exposed to oxidation or corrosion. This diagram shows the current path at the hinge end of the switch. The heavy U-shaped beryllium copper pressure springs carry no current, support no weight. Contacts are completely enclosed.

Universal control for easy installation

Chance Type H Switches are equipped with a universal control crank, with screw point recesses at 10° intervals. This crank makes it easy to adjust the controls to within 5° of any position and permits the control mechanism to be readily adapted to any type of structure.





C53-3

Write for complete information on these new group operated switches.

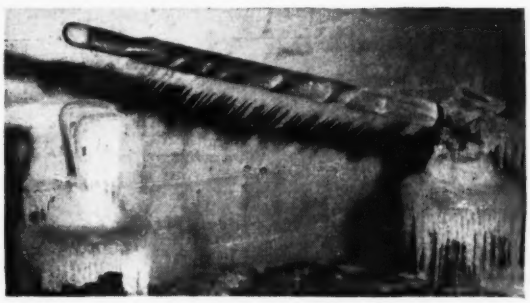
A·B·CHANCE CO·

CENTRALIA, MISSOURI • SAN FRANCISCO, CALIFORNIA

ABC INDUSTRIES

Simple in Design... Superior in Operation!

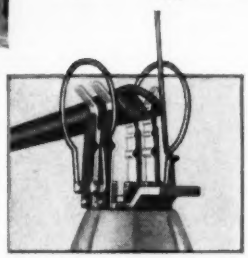
- ONLY 3 MOVING PARTS
- ENCLOSED NO-BREAK HINGE CONTACT
- EASY TO INSTALL ON ANY TYPE OF STRUCTURE

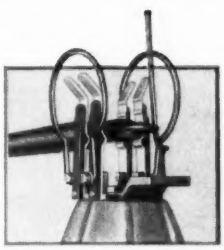


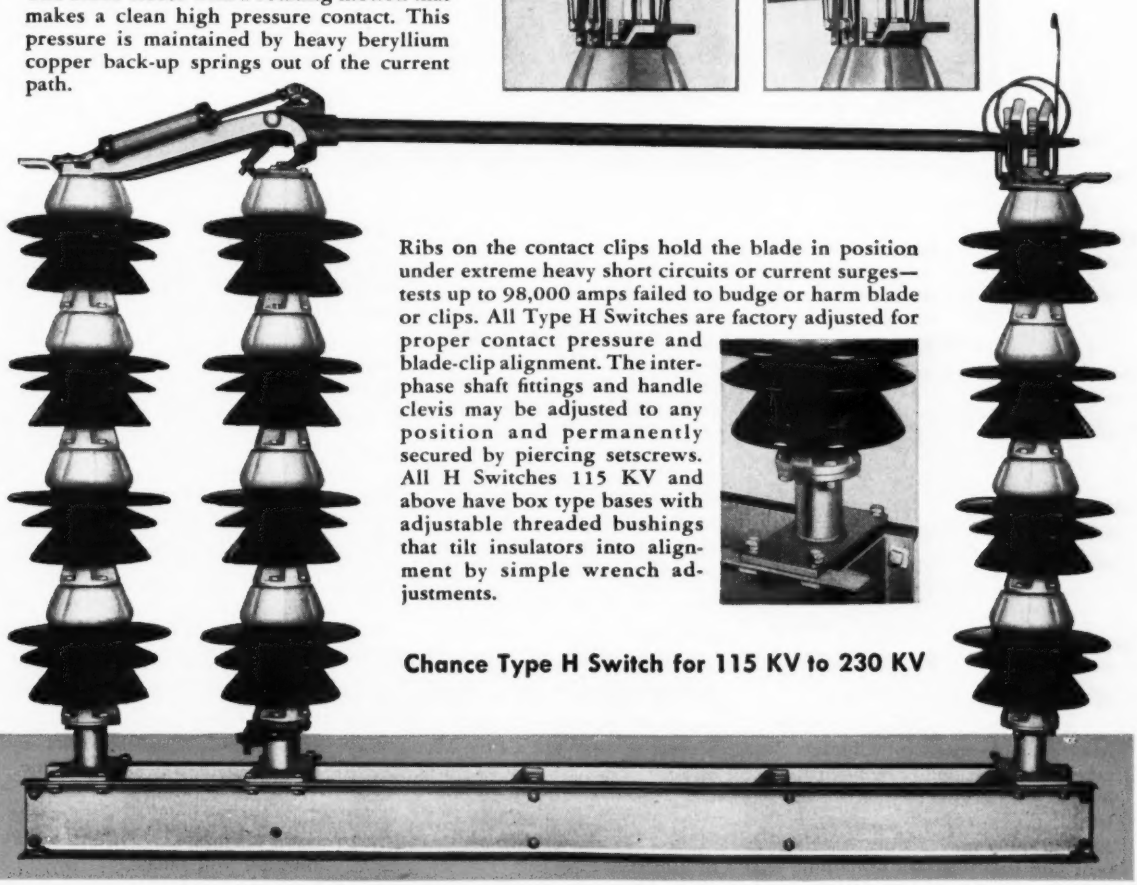
All-weather Operation—This laboratory photograph shows how ice accumulations were easily broken during dynamometer ice tests made on a 161 KV Type H Switch. Tests were made with a steady pull to simulate motor operation. Chance Type H Switches have sufficient leverage to open and close them under a 1″ accumulation of hard, clear, bubble-free ice, made with distilled water slowly frozen to approximate the most severe conditions.

Rotation of Blade Gives High Pressure Contact

The blade closes with a rotating motion that makes a clean high pressure contact. This pressure is maintained by heavy beryllium copper back-up springs out of the current path.







Ribs on the contact clips hold the blade in position under extreme heavy short circuits or current surges—tests up to 98,000 amps failed to budge or harm blade or clips. All Type H Switches are factory adjusted for proper contact pressure and blade-clip alignment. The interphase shaft fittings and handle clevis may be adjusted to any position and permanently secured by piercing setscrews. All H Switches 115 KV and above have box type bases with adjustable threaded bushings that tilt insulators into alignment by simple wrench adjustments.

Chance Type H Switch for 115 KV to 230 KV

ELECTRA'S HUSBAND

How Do You Say Free Enterprise?

"YOU people are kidding yourselves if you think that the public understands what you mean when you praise the free enterprise system," Electra interrupted one evening at the dinner table. "You're talking way over their heads." Three of us—an advertising man, a utility public relations specialist and I—had been arguing the merits of the 1953 Electricity for Better Living Program. She was interested because much of the effort in this program will be directed toward women generally and the housewife specifically.

"I don't know a single woman who could tell you what free competitive enterprise or private initiative means," she continued.

"How about married women?" the advertising man asked. "Are they better informed?"

"No they are not, and if you want me to leave so that you can continue this discussion on a highly intellectual but thoroughly impractical level, just say the word," she fumed.

"By all means stay dear lady," the p.r. specialist said. "Maybe you can temper that great expert's theories with a little feminine common sense."

"Maybe Electra has a point," I said. "There is an increasing belief that great gobs of advertising space are wasted because the language used is too erudite for the average reader. That's especially true of so-called institutional advertising. A lot of it is written to please somebody in the ivory-towered executive offices instead of being directed at Joe Blow and his wife."

"Are you trying to tell me that if I say that free competitive enterprise is the American way of doing business, people won't know what I'm talking about?" the advertising man asked.

"In words of one syllable, yes," Electra answered.

"One of your own people, Carlyle Emery of Ruthrauff & Ryan, will confirm it," I continued. "He says that 100 people were stopped recently on Michigan Avenue in Chicago and asked the question, 'What is meant by the competitive free enterprise system?' Forty-seven per cent refused even to guess the answer. Twelve per cent said that it meant something that was free from controls. Very few could give anything like a correct answer. And some of the assorted replies were almost unbelievable, like 'each to his own,' 'a group of assorted concerns,' 'a leveling-off process' and 'a lot of silly words that don't mean anything.'"

"I'll wager the same thing would happen on Market Street, Wilshire Boulevard, Pike Street in Seattle or Broadway in Portland," Electra gloated.

"All of this is very well," the p.r. man said, "but what do you propose to substitute as a better phrase?"

"Well Mr. Emery has an idea that appeals to me," I answered. "He suggests the phrase 'A Free Man's Way of Life.' He thinks that the number one job of advertising today is to sell our 155,000,000 men, women and children that there is nothing better in the world than a 'free man's way of life.'"

"You might have a lot of trouble working that into good copy," the advertising man commented. "Free enterprise system or competitive enterprise system has a nice ring to it and it's easy to build into strong copy."

"But of what use is it if people don't understand it?" Electra asked.

"You've a good point," the ad man said.

"I like what Mr. Emery says about it," I added. "He remarked that none of us are ever likely to see a torchlight parade of Americans carrying banners labeled 'We Want Free Enterprise' but he could visualize a parade of our people with some of them carrying banners saying 'Down With Slavery—We Want a Free Man's Way of Life.' He has done one other thing that appeals to me. He has asked Congress to set up a new national holiday celebrating the birthday of the Statue of Liberty."

"I'll buy that too," Electra said. "I could stand another holiday around this place. It would be just like any Tuesday."

ONE evening last month I brought home to Electra a postal-sized card that carried the single word "IGHAT" on one side.

"What's this?" she asked. "Another of your Parisian cartoons or the tag line for an off-color joke?'

"It's neither one," I said. "It's an application card for membership in a new organization. Turn it over."

That's what it was. The organization is a grassroots body whose motto is "I'm Gonna Holler About Taxes." Members are called IGHATS and they are dedicated to spread the hue and cry about high taxes from one end of the land to the other. IGHAT was conceived by John Stuart, chairman of the board of Quaker Oats Co. Since its inception it has been adopted by many companies and organizations, which are spreading the program widely. Oil companies, banks and newspapers have taken it up and are proselyting members.

"This I'll be happy to join," Electra said. "So will many of our friends. You know some of us were talking at lunch today about how a number of public officials including California's governor haven't read last November's election returns correctly. The public wants economy in government and taxes must come down."

"You can say that again," I said. "We were looking at some preliminary figures at the office today for our company. It appears as though the net profit for 1952 will be about $11,250,000. But income and excess profits taxes are going to take $8,000,000. That doesn't leave very much for the stockholders. In fact it comes very near being confiscation."

"Well, why doesn't your company holler about taxes?" she asked. "You wait and see the hollering letter I'm going to write our senators and congressmen about our income taxes. We're being confiscated too."

There must be many more companies like ours, I thought. Perhaps they all will holler.

How Moisture is Kept Out of Transformer Coils

Fast sequence from drying oven into tank is one reason why you get consistently excellent insulation quality in Allis-Chalmers distribution transformers.

Here's How It's Done

Core and coil assemblies move continuously through the tunnel-type electrically heated oven partly shown in the background above. Then . . . immediately after the drying cycle is complete . . . they are immersed in dry oil in their own tanks. This prevents any absorption of moisture that might have occurred if the cooling had been done in air. Then a vacuum drawn on the transformer removes any air entrapped in the oil.

Finally, Production Line Impulse Testing

As a final step, production line impulse testing is used to assure uniform high insulation strength.

Get All Benefits

Careful attention to manufacturing detail is only one of the many reasons why you benefit when Allis-Chalmers distribution transformers are on your system. For complete information, call your nearby A-C district office or write Allis-Chalmers, Milwaukee 1, Wis.

A-3977

ALLIS-CHALMERS A-C ALLIS-CHALMERS

Any way you look at it...

SQUARE D's balanced design means a better Motor Starter

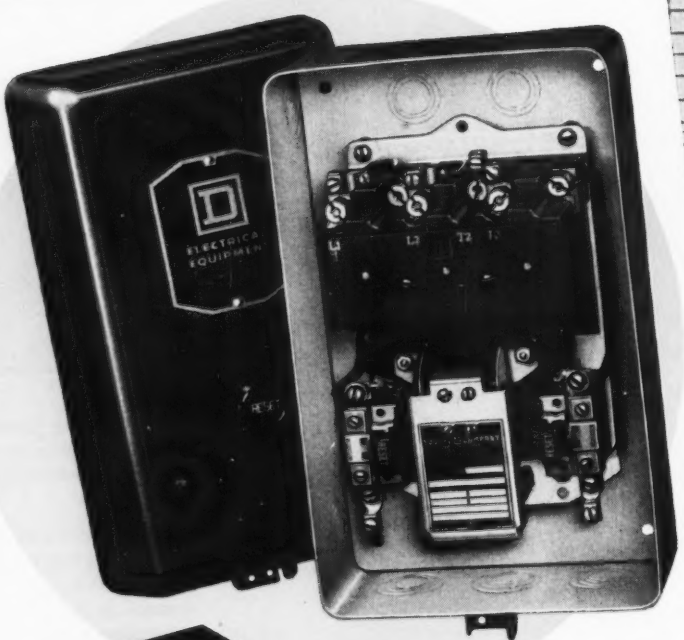
Designed to provide the highest degree of accessibility, flexibility, and compactness —with no sacrifice of performance and long life.

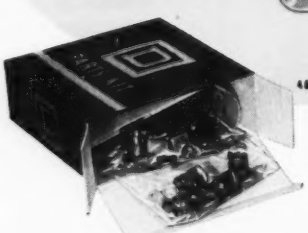
EASY WIRING...
Plenty of wiring space and easy-to-get-at solderless terminals. Installation is a breeze.

ACCESSIBILITY...
Coils, contacts or overload relays can be changed without disturbing external connections. A screwdriver is the only tool you need.

FLEXIBILITY...
Three extra electrical interlocks may be added to size 1 starters; four to sizes 2 and 3. Contacts may be normally open, normally closed, or double circuit.

PERFORMANCE...
Straight line, guided motion minimizes wear. Large silver alloy contacts insure exceptionally long life and trouble-free performance.





"Off-the-Shelf" Parts Kits make normal maintenance easier than ever. Each kit contains parts necessary to replace all load contacts and finger springs. Electrical interlocks also available in kit form.

Write for Bulletin 8536

Square D Company, 4335 Valley Boulevard
Los Angeles 32, California

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

Watch for Square D's Display Coach—Now on Tour!

SUMMER STARTS APRIL 20th FOR FEDDERS DEALERS

. . . with the BIGGEST ad . . . the strongest SELLING IDEA in Industry History!

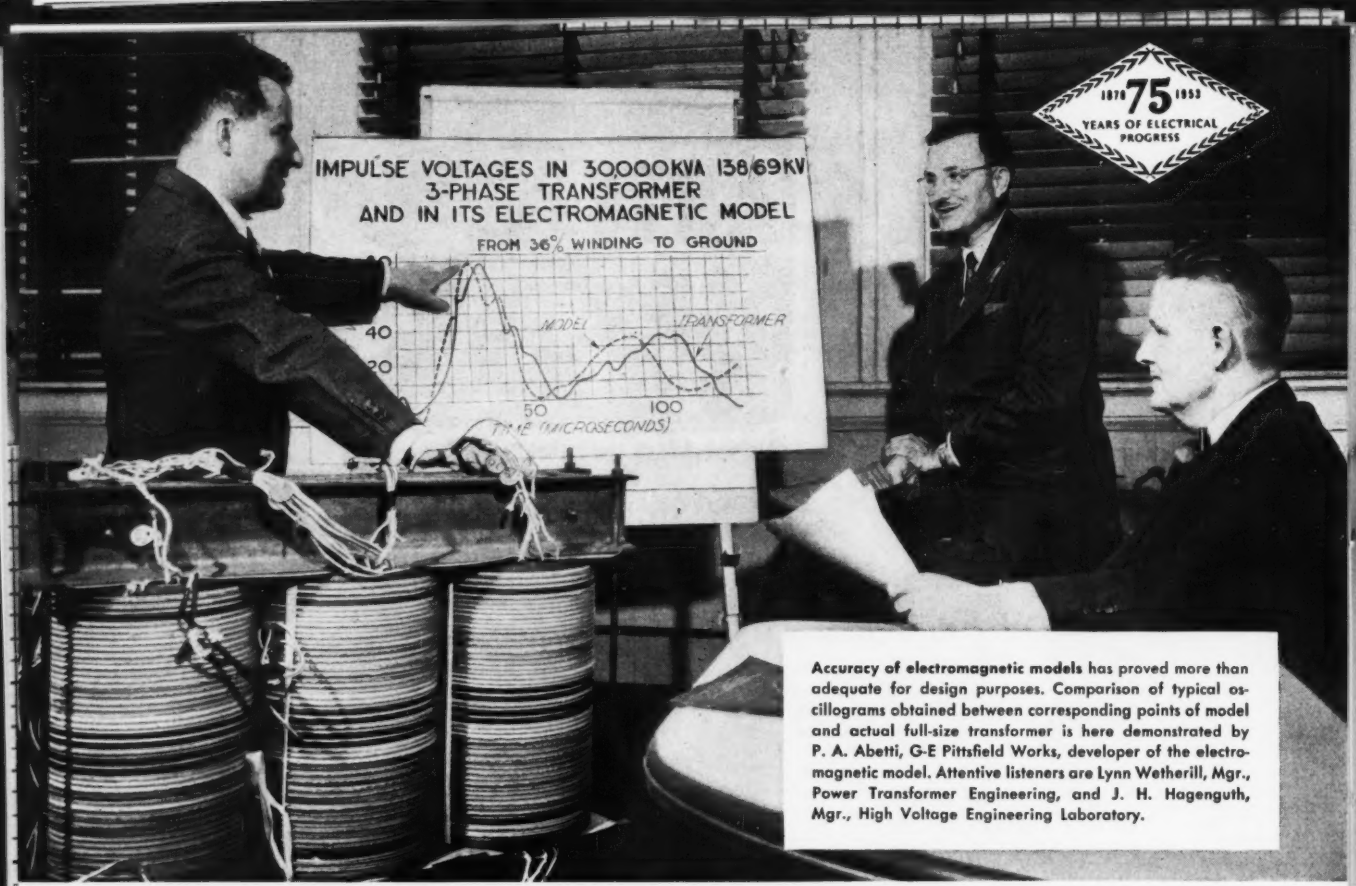
LIFE
APRIL 20th
YOUR FEDDERS DEALER SAYS: GIVE YOURSELF A GUARANTEED
5 Year Vacation
GET AWAY FOREVER FROM HOT, MUGGY WEATHER!
Start now! $3 down, $3 a week—delivers you a Fedders Room Air Conditioner when hot weather hits!
Push a button for the exact climate you want with Fedders amazing new Built-in Weather Bureau!
FEDDERS
COME IN AND JOIN THE FEDDERS 5 YEAR VACATION CLUB. NOW!
FEDDERS

WHEN the April 20th issue of LIFE hits the stands, it's going to start a tropical heat wave for Fedders Room Air Conditioner Dealers! The 2-page spread shown above is just a *part* of Fedders 3-page-plus LIFE ad . . . biggest, most expensive ever run in the industry . . . but take a look at it and you'll see why it's going to bring in customers way ahead of the normal season.

It's got the STOPPING POWER of an elephant gun . . . is there *anybody* who doesn't want a 5-year vacation from hot, muggy weather? It's got PRICE APPEAL . . . without any cut-price, cut-profit shenanigans. It presents the most exciting DEMONSTRATION FEATURE ever offered on a room unit . . . *Fedders Built-In Weather Bureau* . . . "The weather you want at the flick of a button!" *And* this history-making Fedders ad is going to tell people where to buy. The third page in LIFE lists over 1000 of Fedders hardest-selling dealers. With a sharp off-season selling hook like this, no wonder summer starts April 20th for Fedders dealers! Are you selling Fedders? If not, better hurry . . . tie-in . . . don't let easy profits pass you by. Call your distributor right away or write Fedders-Quigan Corp., Dept. EW-2, Buffalo 7, N. Y.

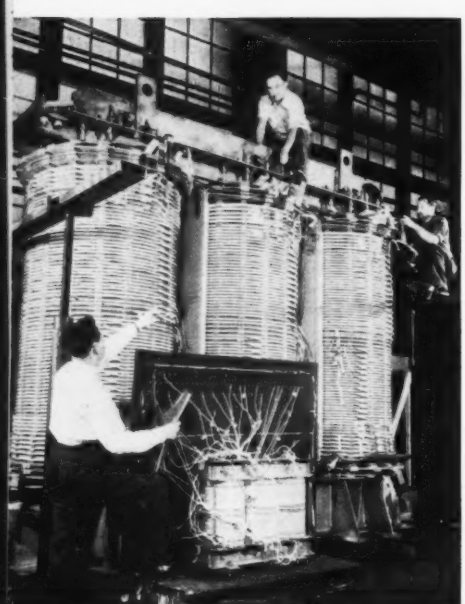
FEDDERS ELECTRIC DEHUMIDIFIER

'53 is going to be a bigger year than ever before for Fedders handy "Electric Sponge!" It's got more applications than any other appliance you can name (except a room air conditioner) . . . a huge unscratched market. And Fedders will help you get it with the biggest sales campaign ever devoted to dehumidifiers!



Accuracy of electromagnetic models has proved more than adequate for design purposes. Comparison of typical oscillograms obtained between corresponding points of model and actual full-size transformer is here demonstrated by P. A. Abetti, G-E Pittsfield Works, developer of the electromagnetic model. Attentive listeners are Lynn Wetherill, Mgr., Power Transformer Engineering, and J. H. Hagenguth, Mgr., High Voltage Engineering Laboratory.

New G-E "Model Testing" technique promises
SMALLER, MORE RELIABLE POWER TRANSFORMERS



Shown for comparison with 33,333-kva core-and-coils, model is only 1/6 the size, 1/216 the weight and may be built in only 1/10 the time. Here P. A. Abetti checks connections in final assembly.

Major G-E development paves way for improved winding structures, reductions in weight

As the demand grows for power transformers of higher and higher voltage and kva ratings, the problem of predicting transient voltages that may occur in the windings becomes increasingly complex.

Accurate knowledge of these voltages—in the design stage—is a vital factor in determining the most effective use of insulation. It has also a bearing on transformer design, which may be reflected in such advantages as reduced size, weight and cost.

Perfected over a three year period, the new G-E development of testing with electromagnetic models offers the first simple, practical method of obtaining complete and accurate knowledge of transient voltages for any power transformer in advance of actual construction.

A small fraction of the size and weight of equivalent full-size transformers, these models not only provide a rapid, precise method of testing established designs, but also open opportunities for the development of new winding structures, leading to improved reliability.

A new tool has been created for accelerating transformer progress. Its successful application is already being reflected in improved G-E power transformers. The knowledge now being gained promises even greater developments for tomorrow. General Electric Company, Schenectady 5, New York. 301-226

MORE POWER TO AMERICA

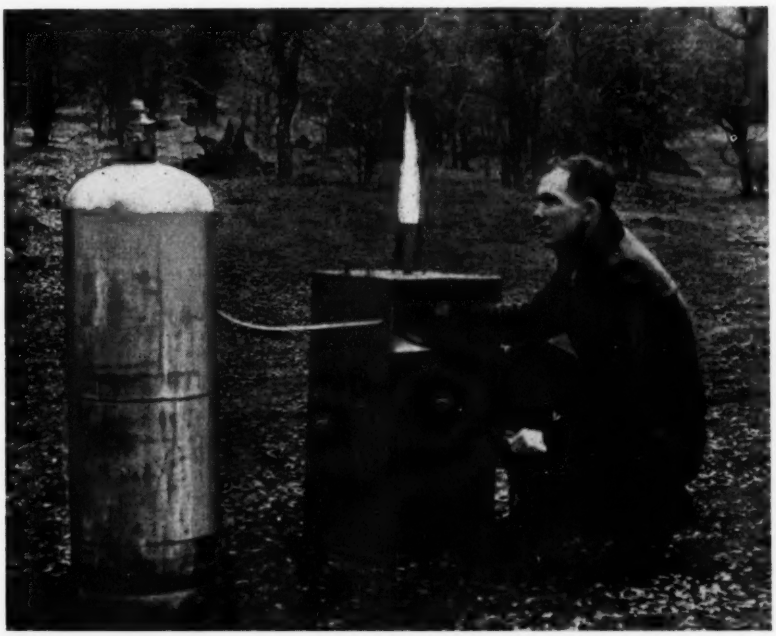
GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

MARCH 1953 Vol. 110, No. 3

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.



LATEST MODEL SILVER IODIDE GENERATOR being lighted off by Irvin Peterson, North American operator, for one of the projects in the high Sierra. Propane-fueled, the generators can operate unattended for more than 100 hours to increase precipitation from . . .

Clouds With A Silver Lining

Four Western power companies are now experimenting with cloud seeding. Increased precipitation ranges from 20 to 30%

Ronald Bollay

North American Weather Consultants
Pasadena, Calif.

Water has played one of the most important fundamental economic roles in the development of the Western states. Without the billions of dollars invested in channeling the available water supply, the West would not occupy the dominant position in agriculture that it holds today—nor the tremendous power potential received by the vast network of hydroelectric facilities from Mexico to Canada.

The new surge of industrial development and increasing use of arid lands have taxed the water resources of the West enormously. One of the methods now under experimentation to alleviate the growing water shortage is being used by some of the leading hydroelectric power companies. The method—cloud seeding—is used to increase the available water supply so that maximum utilization of existing facilities may be made, thus achieving a greater dollars-and-cents return on the existing capital expenditures.

Private power pioneers in the West have much to their credit for the part they have played in developing hydroelectric resources, building large reservoirs for irrigation end-use and assisting in flood control and water conservation.

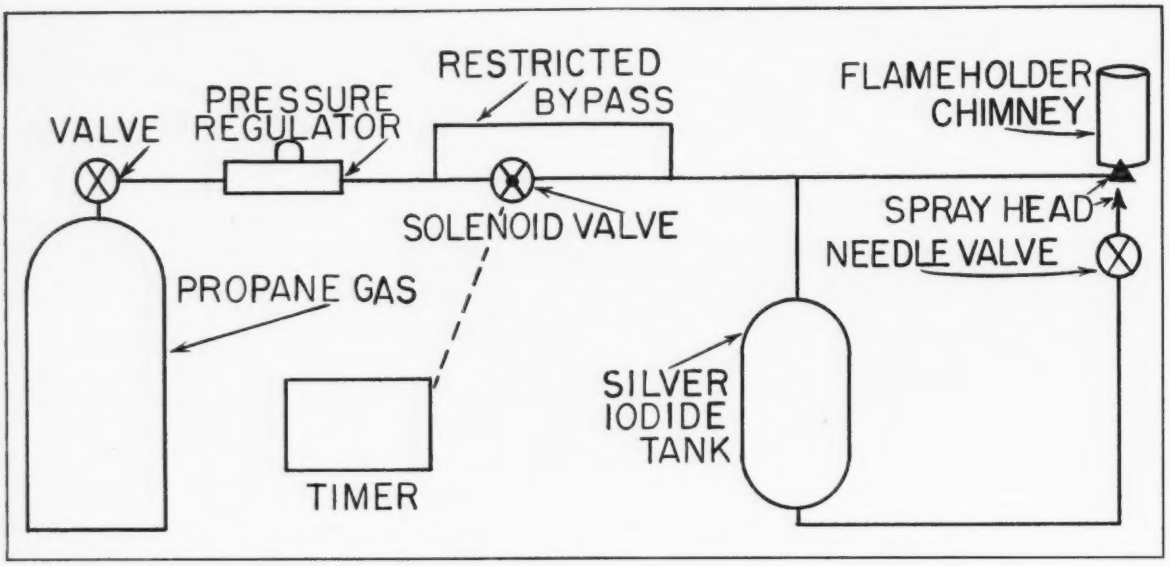
Now they are pioneering again in this new science of cloud seeding. California Oregon Power Co. has experimented for the last four seasons using both aircraft and ground seeding methods. Southern California Edison Co. and California Electric Power Co. are now in their third year of experimentation while Washington Water Power is rounding out its second year of investigation into this new source of power. Pacific Gas and Electric Co. will conclude its first experiments this year.

Historical Background

Before going into the practical applications in the power field, a little background in this new science may prove helpful. Back in 1946, Dr. Irving Langmuir and Dr. Vincent Schaefer of the General Electric Co. performed a series of experiments that pointed the way for modern science to increase rainfall.

Natural rain clouds are made up of millions of tiny supercooled water droplets. These droplets do not begin to freeze until temperatures of about –40 F are reached. As these tiny droplets freeze other droplets are attracted to these nuclei and snowflakes are formed. These snowflakes fall out as snow or rain depending upon air temperatures at ground level.

Dr. Schaefer discovered how to prove this theory by a very simple experiment. His experiment, which can be easily reproduced in any home freezer unit, was as follows: He blew his breath into a freeze unit set at about –10 F. This cloud of water droplets soon became supercooled. Next he dropped a small pellet of dry ice through the cloud. In the path of the pellet a swarm of minute ice crystals became visible and scintillated in the beam of a flashlight. The crystals grew at the expense of the surrounding water droplets and slowly descended to the bottom of the box. If they were to fall through a great thickness of supercooled water droplets, as they do



SCHEMATIC DIAGRAM of the automatic silver iodide generator showing mixing arrangement and the comparative simplicity of the equipment

in a real cloud, they would grow to snowflake size.

What happens is that the thin layer of air neighboring the dry ice pellet is chilled to below the critical –40 F level and ice needles form spontaneously. Convection currents mix the trail of ice crystals throughout the box and they thereby nucleate all of the supercooled water droplets present.

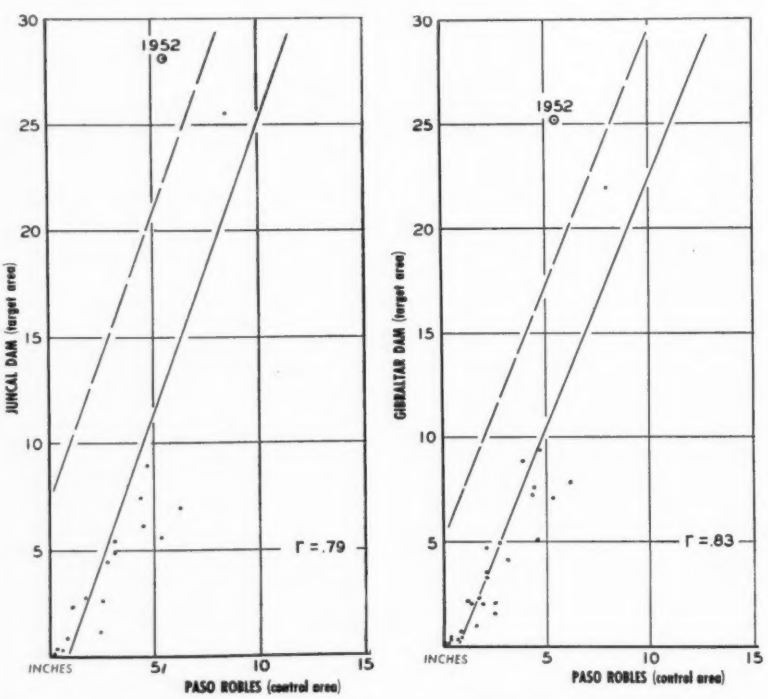
Dr. Vonnegut, also of the General Electric laboratories, later discovered that silver iodide crystals would also serve as artificial nuclei at temperatures as high as 23 F. These silver iodide crystals can be easily produced in a silver iodide smoke generator at the rate of 10^{15} crystals per minute per gram of silver iodide burned. Subsequently, it has been found that other substances will serve as nuclei but not at temperatures as high as 23 F.

Practical Application

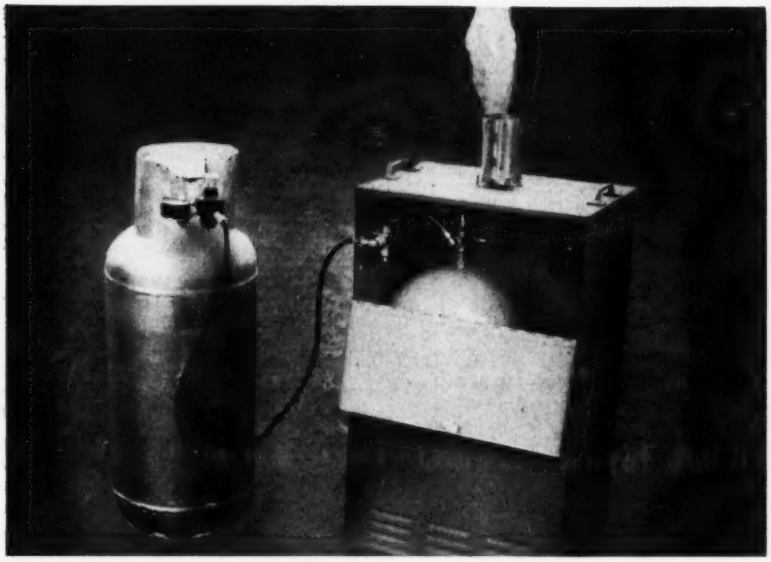
To seed a cloud properly there should be about one nucleus for every thousand water droplets. This permits a thousandfold increase in drop volume, or a tenfold increase in diameter, which is adequate to build up small snowflakes. Should there be one nucleus for each droplet, a swarm of small ice needles would form because of the sharing of the water by each crystal. Under these conditions no snowflakes could develop. Clouds treated in this manner would be completely iced and probably float away as a cirrus veil. This is what is known as overseeding. It results in a decrease in precipitation, as might be expected.

A silver iodide smoke generator produces 10^{15} crystals per minute. This is accomplished by first vaporizing the silver iodide at a high temperature, then cooling it rapidly or quenching it. Sublimation results in a swarm of smoke crystals about .01 microns in diameter. It is obvious that the direct introduction of this smoke into a supercooled cloud from a source producing 10^{15} crystals per minute, even if done from a swift airplane, must result in overseeding. Again, turbulent diffusion of the ice crystals resulting from the initial nucleation may result in an appropriate mixture of ice and water droplets far downwind where increased precipitation can occur.

To avoid overseeding the smoke must be introduced into the cloud from well beneath the freezing level

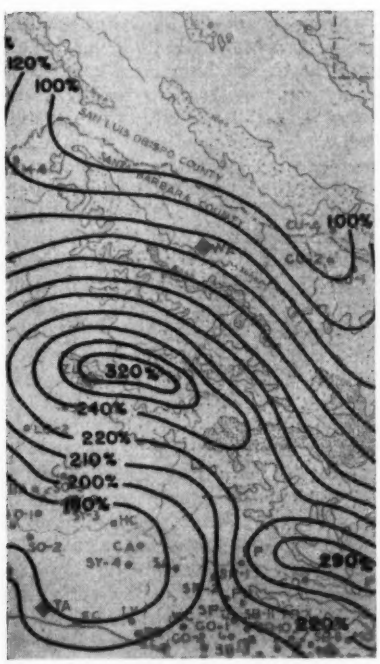


COMPARATIVE precipitation at two dams in target area with Paso Robles area to the north



SILVER IODIDE GENERATOR with automatic pulsing timer operates unattended for 100 hours

so that diffusion will result in proper concentrations before the smoke reaches the supercooled portion of the cloud. Under storm conditions, air currents exist that are capable of carrying the smoke particles from the ground to cloud tops in a matter of hours, or sometimes even minutes. Such currents account for the presence of pollen, dust, sea salt and other types of small particles, which are encountered at all elevations.



RESULTS of the Santa Barbara cloud-seeding program in per cent of normal precipitation

Visible Effects

In areas where silver iodide smoke generators have been used the following general results appear: In mountainous terrain, where the smoke is released from windward slopes, appreciable increases in precipitation are noted in an area extending about 40 miles downwind and about 25 miles wide. No effect occurs in the first few miles because the smoke has not diffused upward into the supercooled clouds in that distance. If the freezing level and cloud ceiling are low, there may be a region of overseeding in the first five or ten miles. In the center of the seeded area precipitation is apparently often more than doubled.

In flat terrain where the smoke is not aided in its upward diffusion by upslope winds, the area of effect may be at least 10 to 20 miles downwind and may extend for a distance of 100 or even 200 miles downwind. If the generator is located at a below-freezing temperature level (either on the ground or in an airplane) and the clouds are close to the generator, overseeding in the first 10 or 20 miles may quite materially reduce precipitation there.

Legal Aspects

With this new technology of cloud seeding we are on the threshold of controlling certain weather events on a fairly large scale. Legislation controlling this new technology has already been enacted by several of the Western states. Many of the others will have it under discussion at their next legislative session. It is interesting to note that, after four years of commercial operations in the West, no law suits have gone to court. In fact, the only legal dispute has been between diverse agricultural interests in the State of Washington.

By carefully controlled operations in areas of unified interests North American Weather Consultants believe that very few disputes will arise. The real danger exists with inexperienced operators who do not have the facilities or background to determine the proper criteria as to when to seed and when to refrain from seeding.

Tangible Results

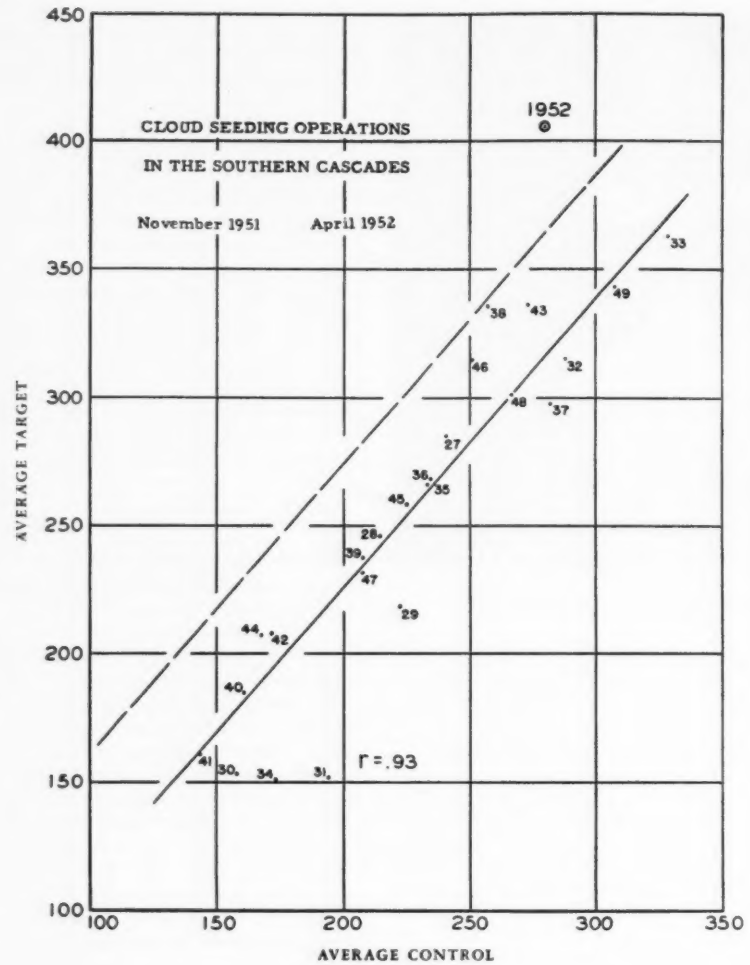
Results and absolute proof of results are still question marks for many engineers today. Dealing with a variable like weather, it is difficult to prove that specific results are due entirely to cloud seeding.

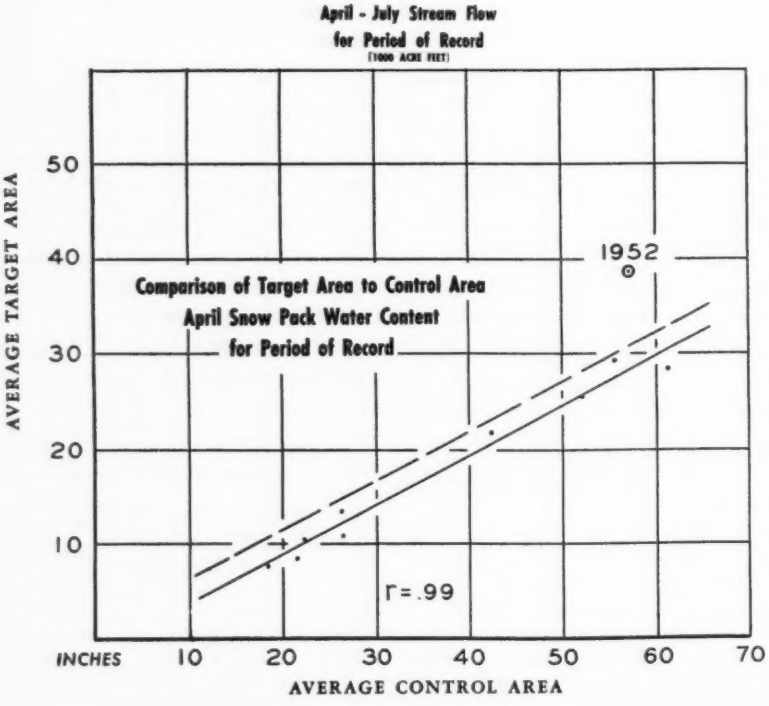
Several methods have been devised to make evaluation based on statistical methods. Each has some advantages and disadvantages. North American Weather Consultants have used a number of the more adaptable methods for evaluation of their projects and it is believed they produce the most reasonable conclusions. An average of all the projects conducted by North American has shown increases in precipitation ranging between 20% and 30% for a season.

Evaluating Results

The principal problem in evaluating a cloud-seeding project is to segregate the natural precipitation from the artificially stimulated effects. The major part of this difficulty arises from the fact that cloud seeding is apparently most effective at the same time that conditions are most favorable for natural precipitation.

Scatter diagram comparisons of target area precipitation to that of a presumably unaffected but correlated control area is one of the methods of evaluation used most extensively by North American. The ordinant of the scatter diagram is customarily the target area station or target area average precipitation and the abscissa is that of the control area. One point is plotted for each month or for each season from the past historical record. Because of the existing correlation between target and control area precipitation (when they are not too far separated), the historical points tend





to fall along a line. This line can be expressed statistically by a linear regression formula that affords a means of predicting from any month's or season's control area precipitation what the target area water content should be in the absence of any disturbing influence such as that produced by cloud seeding.

If the seeded month's or season's precipitation lies above the regression or prediction line, then this fact suggests that cloud seeding increased precipitation in the target area. The distance above the line that the precipitation points fall in relation to the scattering of the historical points about the regression line can be used as a basis for judging whether the excess precipitation was real or merely because of a chance variation. A measure of the scattering of the historical points about the regression line is indicated on the scatter diagrams by means of a dashed line, which lies two standard deviations above the solid black prediction line. The odds are roughly 20 to 1 that no point will fall above this line or below a corresponding line two standard deviations beneath the regression line during any natural storm.

The accompanying scatter diagrams indicate the effectiveness of some of the programs conducted by North American last year.

Economics

Economically, cloud seeding has immense possibilities. Even a very small increase over a large area can materially affect the economy of the water users. If we use a 20% increase because of cloud seeding as a standard and cover a typical mountain watershed area of about 2,000 square miles, having 48 in. of normal seasonal precipitation, 256,000 acre-ft of extra water would be created, assuming 25% of the total precipitation went into the reservoirs. If this were sold as irrigation water at $10 per acre-ft, it would be worth more than two million dollars, more than 30 times the cost of such a program.

The future looks bright for cloud seeding and as additional research is conducted by private enterprise it is felt certain that efficiency of the operations will yield still greater returns.

At the present stage, with about four years of development, we can work only with a small fraction of the atmosphere, but we look forward through continued research to a greater abundance of water and more stable hydroelectric resources for the expanding West.

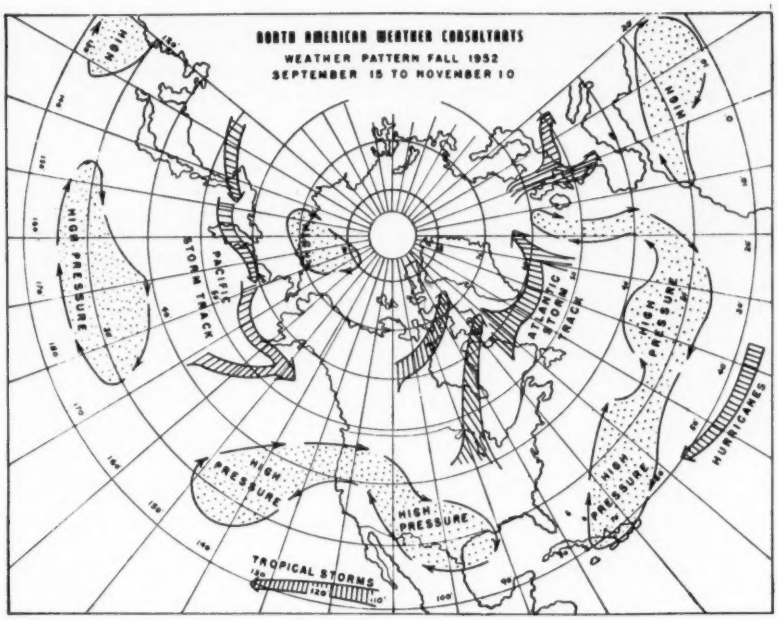


CHART 1—Hemispherical weather patterns like this are used in long-range weather forecasting

Crystal Ball Viewed Long Range

Different appproach to long-range weather forecasting borrows from systems used in the past to evolve a promising new technique

D. G. Van Ornum
North American Weather Consultants
Pasadena, Calif.

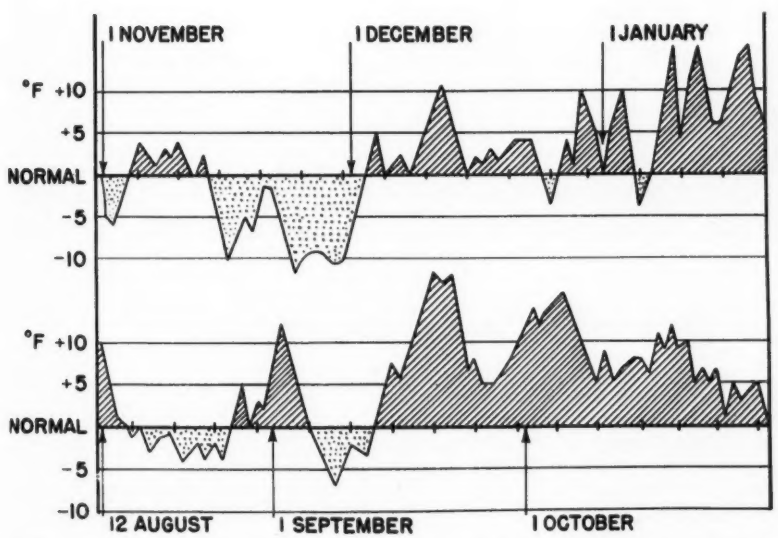


CHART 2—Mean temperature departure from normal is used to predict weather in Portland area

Forecasting weather conditions for periods of more than just a few days has been attempted through almost every possible system from observations of caterpillars to planetary configurations. Some of the more serious efforts have been as follows:

Solar Radiation Studies

Variations in sun spot numbers and small fluctuations in the solar constant have been related to weather changes by any number of investigators but without much success. Failure has been because of an inability to discover the mechanism whereby changes in solar radiation act on the atmosphere. Also, while variation in quantity or quality of solar radiation is undoubtedly a very important factor it has been difficult to determine. A simple measure such as sun spot numbers is plainly not the answer.

Cycle Studies

After looking over any series of rainfall or temperature data, cycles or periods of various lengths are in evidence. However, with careful study the number of cycles in any set of data becomes large and when additional data are added more cycles almost always are required.

Analogue Studies

This method is frequently used but results are generally indifferent. The rainfall or temperature occurrences for several months can be compared with those of past years and the most similar used as the forecast. This method fails because of the extremely complete nature of weather. There is reasonable doubt that two similar months over any large area have occurred since good weather records have been taken and the possibility of two similar years seems very remote.

Weather Pattern Studies

In recent years with the advent of fairly complete weather maps it has become possible to draw charts showing the prevailing weather pattern for a given period of time. That is, the track of the more important storm systems can be located and the large persistent high-pressure or relatively storm-free areas can be located. (See chart.) When this has been accomplished an estimate as to changes likely during the next few months based on seasonal considerations or currently observed trends be-

comes possible. A considerable number of successful forecasts have been made by this approach.

There are other approaches to the long-range forecast problem but it is believed these four have received the most attention.

New Approach

The North American Weather Consultants are developing a forecasting system that borrows from all of the approaches mentioned, but at the same time requires an understanding of physical significance of the technique used. Chart 2 is a plot of mean temperature at Portland, Ore., running from Aug. 12, 1952, to Jan. 20, 1953. It is intended to show the atmospheric pulsations or cycles as they appear in a plot of temperature. First, the shorter term fluctuations, five days to 15 days, when watched on the weather maps are definitely related to the large masses of air moving around the hemisphere in the migratory high-pressure cells. These cells are always in evidence.

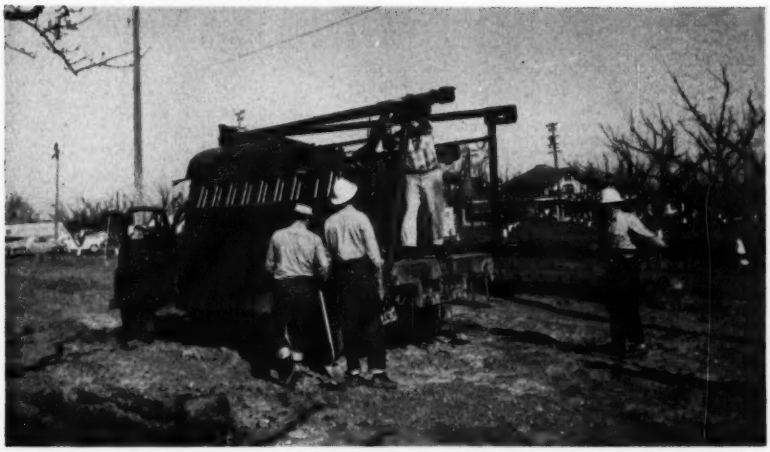
The wind speeds during winter are invariably faster than during the fall causing the air masses to move more rapidly so that the predominance of shorter time intervals in the November to January curve is to be expected. Understanding and being able to forecast these 5-to-15-day intervals is important in determining when highest or lowest temperatures and storm intervals will occur. However, inspection of Chart 2 clearly points out that a much larger and more important pulsation than that caused by the migration of air masses is involved. Study of maps similar to Chart 1 in conjunction with temperature curves such as Chart 2 shows that this important large-scale pulsation is because of a fundamental shifting of the entire weather pattern of the Northern Hemisphere. For example, the pattern shown by Chart 1 for the interval from Sept. 15 to Nov. 10 was duplicated in many respects by the weather pattern of January 1953 after consideration of seasonal differences is made. Also the patterns of November 1952 and part of August and September were similar but both of these were almost completely out of phase with Chart 1. This shift of phase during an approximate interval of three months has been observed very frequently and undoubtedly represents a fundamental property of atmospheric circulation. The data of Chart 2 have been arranged to point out this pulsation.

It is believed that studies into the actual mechanisms of weather development will slowly result in the perfection of a technique that can correctly assimilate data concerning solar radiation fluctuations, pulsations of the atmosphere, partial analogues and weather patterns and come up with a reliable forecast. Even now with the work of sifting fact from fancy just begun, some very good results have been attained.

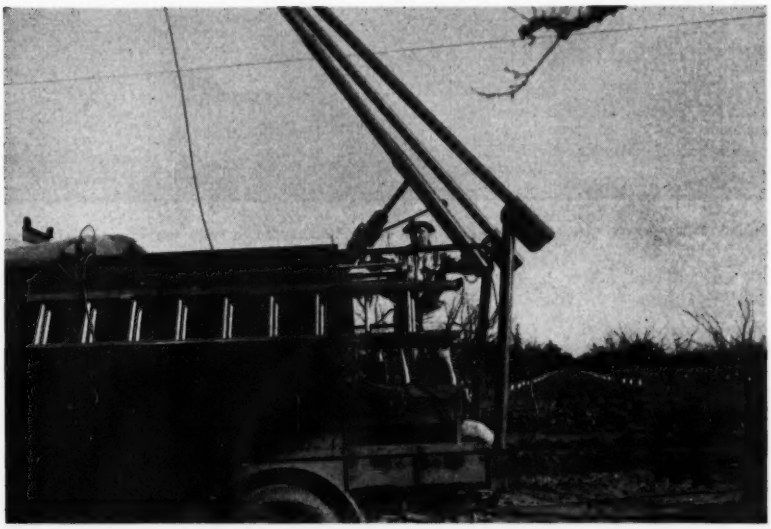
Too Much Weather Confronts High Sierra Repair Crew

To fill in a tramway trestle halfway up a 5,600-ft-long tram that is pitched at 70% in some places was a job that required mountaineer know-how and kept six California Electric Power Co. men under pressure to complete the work last fall before the rugged Sierra winter set in. The trestle is one of two tramways the company operates high above its Rush Creek hydro plant to provide access to Agnew and Gem Lakes and to Rush Meadows reservoir.

The current trestle job is part of a series of improvements Calectric will make on the Agnew and Gem trams built in 1915. After the snows are gone this spring the filled-in trestle will be fitted with new trackage. The trams will get new cable and the Agnew tram a new hoist that has been purchased from a mine at Tonopah. With a new tram car, the job will cost about $26,000.



LESS THAN A MINUTE is taken to raise this hydraulically operated pole derrick ready for use



SAFTEY is assured by hydraulic cylinder and securely locked legs on the live boom pole derrick

LIVE BOOM greatly extends range of the derrick operation on the job and in the pole yard

How poles are set quicker with a

Hinged Derrick

A hydraulically operated jackknifing or folding type of pole derrick used by Pacific Gas and Electric Co. is showing substantial savings in distribution work. Two features make this possible. First, the derrick legs hinge like the blade of a jackknife and with a hydraulically operated stiffleg the derrick can be raised from traveling position, ready for use, in less than a minute. Second, the stiffleg extends hydraulically to give the derrick a live boom with only a single winch. A live-boom derrick ordinarily requires two winches.

Views of the equipment are shown by the accompanying staff photographs. When in the most vertical position, the derrick stands 23 ft above ground making it possible to set up to 50-ft poles. Weight capacity in this position is 4,500 lb. With the derrick in its most horizontal position, a load of 1,200 lb can be lifted and the boom raised on up to vertical position. This feature is useful in the pole yard for loading poles.

It is a time saver on the job also because the truck can be spotted in the setting position, the boom lowered to reach out and pick up a pole some distance from the hole, and then straightened up for setting the pole.

Legs of the derrick are made of 3½-in. OD, 3/16-in. wall, seamless steel tubing. The two members of the A-frame hinge as shown and when straight, lock securely in place by manually placed keeper pins to insure maximum safety. The stiffleg member, also hinged, is equipped with hydraulic cylinder for extending the boom, and for raising and lowering the derrick from traveling position. Operation is by optional dash or floor controls in the cab of the truck. American Truck Equipment Co. of Portland, Ore., is the manufacturer of this equipment.

Adult driver education program of PG and E pays off in a reduced accident frequency rate

SIDE VISION test is given to show how side vision tunnels down with the increase of speed

HOW TO MAKE BETTER

Traffic accidents with resultant deaths, injuries, property losses and increasing insurance premiums are focusing public attention on the need of training drivers. The driver training and testing program of the Pacific Gas and Electric Co. is aimed at adult driver education. While in general it follows established, conventional lines, certain innovations have proved worth-while in results obtained. Any effort in the final analysis must be judged by results and while comparatively young the program has already shown certain definite benefits, as shown in the accompanying box. Specifically the program has:

1. Reduced the frequency of accidents classified as avoidable by the company driver
2. It has been enthusiastically received and accepted by both management and employees
3. It has resulted in highly favorable newspaper publicity
4. It has received the commendation of state and civic traffic authorities

Fleet Size

Operations of PG and E extend over an area of approximately two-thirds of the State of California. They involve the use of about 5,000 vehicles that rolled up in excess of 48,000,000 miles during 1952. It is estimated that between eight and nine thousand employees operate these vehicles either as a necessary part of their regular work or casually. This group is composed of average, adult drivers who largely learned to drive by "rule of thumb." As a result many have unknowingly developed poor and even dangerous habits, primarily from the lack of any real training or basic education in what might be called "the facts of life" about driving.

Pre-Program Background

Approach to this program predates its implementation by several years. During this period all automotive accident reports were carefully analyzed. Results indicated that a comparatively small number of driving habits were the cause of a large percentage of the accidents. To obtain maximum results from the program, what might be termed "aimed fire" was used in directing elements of the program at these habits. A number of similar programs in other organizations are more general in their approach to the problem and in their training.

Major Elements of Program

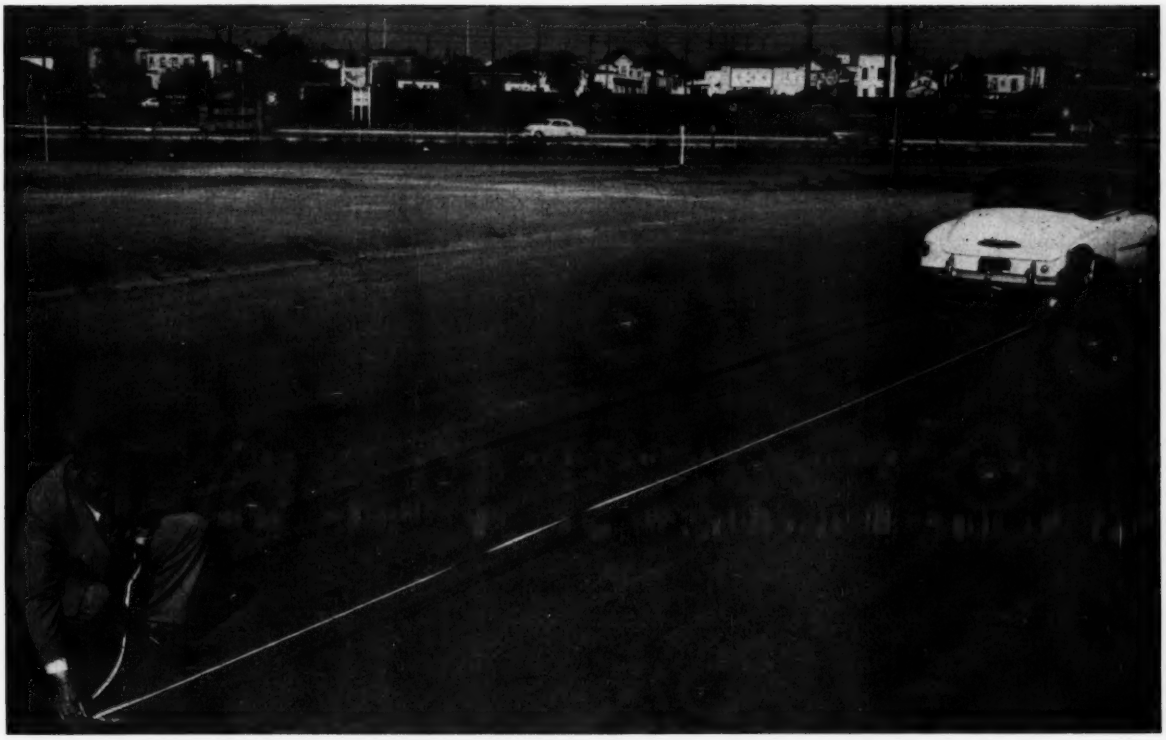
There are four main elements in the PG and E program:

1. Visual tests. In this phase, through the use of the Keystone telebinocular, visual acuity, depth perception and color perception are checked as far as the red and green of traffic signals are concerned. All of these tests are at the far-vision point. There is no check of near or reading vision. By use of the American Automobile Assn.'s "field-of-vision" apparatus, each driver is checked for tunnel vision. By the use of plywood "blinders" with this apparatus (see photograph), there is presented side vision vs speed. This is more fully discussed later.

2. Road test in traffic. This phase of the program is primarily a check of normal driving habits in traffic. The road-test-in-traffic check sheet is used, as prepared by Prof. Amos E. Neyhart and published by the AAA. A rather limited use of this check sheet is made, the actual usage and reasons being discussed later.

3. Brake reaction test. Each driver makes an emergency stop at 15 and 30 mph driving a light passenger car equipped with an AAA model B detonator. On each of these runs the driver personally measures his thinking distance and braking distance. Normally two drivers are taken on each run as these runs combine the road test in traffic and brake reaction test.

4. Coordination. It is felt that proper coordination with the driver under test is one of the most important elements of the program. Indi-



BRAKE REACTION test measures driver's thinking and braking distance on emergency stops in light passenger car at 15 and 30 mph

DRIVERS

E. F. Hockenbeamer
Safety Supervisor
Claims and Safety Department
Pacific Gas and Electric Co.

vidual data for each driver from the three previous phases are reviewed. Copies of visual, road-test and reaction-test data are given to the driver. Traffic habits checked during the road test are discussed. For each habit checked and discussed an attempt is made to give first a practical, common sense reason for its being checked and then another practical suggestion for its correction.

During this phase the measurements of the employee's stops previously mentioned are drawn in on the data sheet. On p 82 is a reproduction of an earlier version of this sheet showing the data as recorded. Notes and comments on this sheet are normally given verbally and the car positions shown by X's and dotted lines. Fifteen and 30 mph are now used instead of 20 and 30 as shown, and reaction time has been omitted entirely.

In the visual phase, the use of side vision vs speed was mentioned. So far as can be determined PG and E's use of the data is an innovation in this type of program. Anyone who has been connected with educational driver tests fully realizes the need of some way not only of getting the driver's full attention but also of removing the know-all-the-answers attitude of the average adult. This applies especially to one who has driven for a number of years and has been fortunate enough never to have had an accident.

In side vision vs speed information has been taken on the functioning of the human eye and given a practical application to driving. By the use of plywood blinders it is shown how the normal stationary side of vision of from 180° on up is reduced with speed—down to 42° at 60 mph. This is then correlated to vision at intersections, signal lights and traffic signs. Each individual is shown how he can check this for himself.

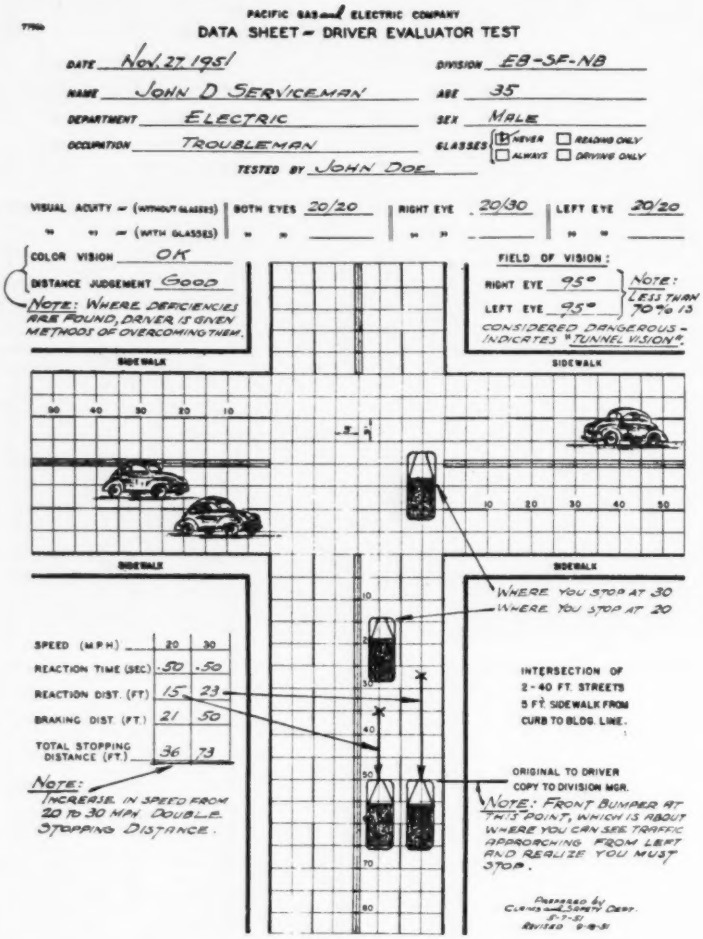
The writer wishes to diverge with the comment that this decrease in side vision with speed seems to be a logical

Five Good Safe Driving Rules

Every PG and E driver is encouraged to know and live these five short rules:

1. Always concede the right-of-way where any question is involved
2. Drive defensively at all times — foresee and analyze traffic situations that may develop
3. Concentrate on the job of driving
4. Show to all others the courtesy you would like shown to you
5. Keep full control of your vehicle at all times and under all conditions

Drivers Learn Lesson from Layout of Own Test Data


PACIFIC GAS and ELECTRIC COMPANY
DATA SHEET – DRIVER EVALUATOR TEST
DATE Nov. 27 1951
DIVISION E8-SF-NB
NAME JOHN D SERVICEMAN
AGE 35
DEPARTMENT ELECTRIC
SEX MALE
OCCUPATION TROUBLEMAN
GLASSES NEVER READING ONLY ALWAYS DRIVING ONLY
TESTED BY JOHN DOE
VISUAL ACUITY – (WITHOUT GLASSES) BOTH EYES 20/20 RIGHT EYE 20/30 LEFT EYE 20/20
– (WITH GLASSES)
COLOR VISION OK
DISTANCE JUDGEMENT GOOD
NOTE: WHERE DEFICIENCIES ARE FOUND, DRIVER IS GIVEN METHODS OF OVERCOMING THEM.
FIELD OF VISION:
RIGHT EYE 95°
LEFT EYE 95°
NOTE: LESS THAN 70° IS CONSIDERED DANGEROUS – INDICATES "TUNNEL VISION".
SIDEWALK
SIDEWALK
SIDEWALK
SIDEWALK
WHERE YOU STOP AT 30
WHERE YOU STOP AT 20
SPEED (M.P.H.) 20 30
REACTION TIME (SEC.) .50 .50
REACTION DIST. (FT.) 15 23
BRAKING DIST. (FT.) 21 50
TOTAL STOPPING DISTANCE (FT.) 36 73
NOTE: INCREASE IN SPEED FROM 20 TO 30 MPH DOUBLE STOPPING DISTANCE.
INTERSECTION OF 2-40 FT. STREETS 5 FT. SIDEWALK FROM CURB TO BLDG. LINE.
ORIGINAL TO DRIVER
COPY TO DIVISION MGR.
NOTE: FRONT BUMPER AT THIS POINT, WHICH IS ABOUT WHERE YOU CAN SEE TRAFFIC APPROACHING FROM LEFT AND REALIZE YOU MUST STOP.
Prepared by Claims and Safety Dept. 8-7-51 Revised 9-6-51

Accident Frequency Index Reduced 14%

In the face of increased vehicles in the fleet, miles traveled and the general increase in truck and auto traffic as indicated by the state figures on fuel consumption and vehicle registration PG and E, through driver education, has been able to reduce its accident frequency index from 1.86 in 1949 to 1.60 in 1952.

	1949	1950	1951	1952
No. Vehicles in fleet	4,181	4,299	4,794	5,000 (a)
Miles Traveled (millions)	41.26	41.11	44.63	48.25
Avoidable Accidents/100,000 miles				
Fleet	1.86	1.74	1.64	1.60 (a)
Typical Rural Div.	2.22	1.57	1.95	1.34 (b)
Typical Metropolitan Div.	5.63	4.52	4.86	4.18 (b)
State of California Gasoline & Diesel Fuel (millions of gal)	2,971	3,171	3,445	3,688 (c)
Vehicle Registration (thousands)	4,220	4,676	4,974	5,200 (c)

(a) estimated.
(b) 10 months of 1952.
(c) Data—Courtesy California Highway Patrol.

answer to some of the high-speed intersection accidents where there is no evidence of brake application by either car. How many of those reviewing accident reports have seen the statement: "I did not see the other car." How many readers have had a car or pedestrian suddenly appear from either side and wondered "whereinell did that car come from?" In one group of several hundred road tests in traffic with the driver knowing he was under test and being checked, 5% went through red lights or missed stop signs. It is revealing to observe the change in mental attitude as the discussion of side vision vs speed is given. A surprisingly large number of individuals will mention some personal driving incident that correlates with the data given at the end of the discussion.

Driver testers who have given the road test in traffic, both prior to and since this element was included, have reported a very different attitude toward the rest of the program. It might be mentioned that this element was added to the visual phase as a direct result of a fatal intersection accident where there was no apparent reason for its occurrence and no brake marks or skid marks from either car involved.

Road Test in Traffic

In giving the road-test-in-traffic phase of the program perfect driving is not sought nor is improper mechanical handling of vehicle controls criticized. Earlier, certain habits involved in the majority of accidents were mentioned. In this part of the program the use of the check sheet is limited to those items that correlate to this list of habits. They are:

1. Too fast for conditions (intersection, road surface, weather, fatigue, etc.)
2. Improper turning (failure to turn safely after looking, signaling and looking again)
3. Following too closely
4. Failure to yield right-of-way (legal or courtesy)
5. Failure to make a full stop where required
6. Failure to observe conditions (inattention, failure to properly anticipate traffic hazards, depending on stop signs or traffic signals, inadequate side clearance, etc.)

It is felt that this effort to teach defensive driving will automatically eliminate mechanical abuse of equipment and vehicles, and that emphasis on the mechanical phase would tend to make the program less personal to the individual. An attempt is made

to put each driver completely at ease during his road test and have him drive normally to allow a fair habit check. Where heavy city traffic is available, the driver is so busy that he will forget he is being tested and checked and will drive normally. This is an ideal condition, but unfortunately in suburban and rural areas such roads are not always available. In these areas what can be observed is checked and frequently the driver is told of additional habits noted in the more congested traffic areas.

Coordination

The importance of coordination was mentioned earlier. It is in this phase that every effort is made to make the driver feel that this test is for him personally. Possible effects of poor driving habits and of other deficiencies are shown to him as an individual. He is shown how they can cause him trouble as an individual. It is emphasized that habits found with company vehicles will usually also be evident in driving his personally owned car. The statement is used that driving habits are not taken off and changed as may be done with work clothing. There can be no argument that defensive driving, emphasized in the program, is practical.

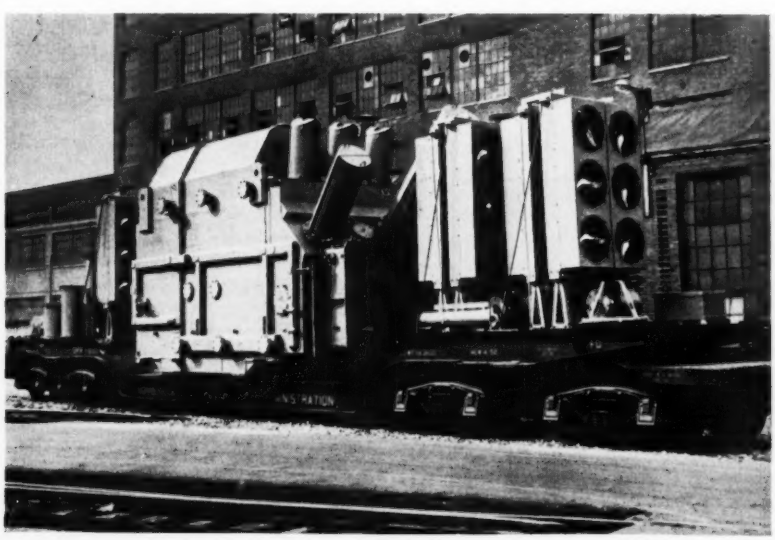
In using the data sheet—driver evaluator—the distance measured in the brake reaction test is tied to a normal 40-ft street intersection. These figures, especially reaction distance, are used to show the dangers in following too closely and the value of slow, smooth braking as well as speed control at intersections. Road tests, brake reaction test and coordination phases are normally limited to a maximum of two individuals at a time. During this phase an attempt is made to teach the facts of life about driving—those physical laws and facts applicable to vehicle operation. Included are acceleration, deceleration, friction, centrifugal force and the kinetic energy of a vehicle in motion.

Personnel used to operate the program are divided into eye testers, who handle the visual phase only, and driver testers who handle either the balance of the program or, under certain conditions, the entire program. The key position of the driver tester cannot be overemphasized. He can either make or break the program. He must have the patience of Job. He should have cast-iron nerves or preferably no nerves at all. He must be a diplomat of the highest order. His criticism must always be constructive. He must be able to take advantage of any off-standard results, turning these to an advantage rather than allowing them to distract from or discredit the program. His job is fascinating but tough. Above all, he must always sincerely believe in his work and be able to convey that belief to each individual with whom he comes in contact.

Our driver testers are outstanding in their ability to put this program over successfully. In general their backgrounds include experience as servicemen or truck drivers, in all cases with excellent driving records. In a few cases the company has had them take a fleet supervisor's training course. This is a one-week course given annually by the Extension Service of the University of California. It is felt that this type of course, especially after the driver has had some field experience, is very valuable.

Summary

Final once-over-the-system tests are nearing completion at this time. A permanent program is under consideration that may materially expand in extent and scope the present activities. Such a program could well include the issuance of a company driver permit that would indicate specific vehicles and equipment that the man is qualified to handle. Such a permanent program should also include provisions for retesting at regular intervals. As with many safety programs, it is almost impossible to rate results in a dollar-and-cents evaluation. The frequency of avoidable accidents is used in comparing figures from year to year to judge results. During the past several years there has been a constant increase in fleet mileage, a steady increase in the number of vehicles in the fleet, an enormous increase in the number of individuals driving and a heavy increase in traffic generally. In the face of these facts, PG and E frequency has declined. It is felt that, with all other increases, if frequency can be held even it is indicative of results.

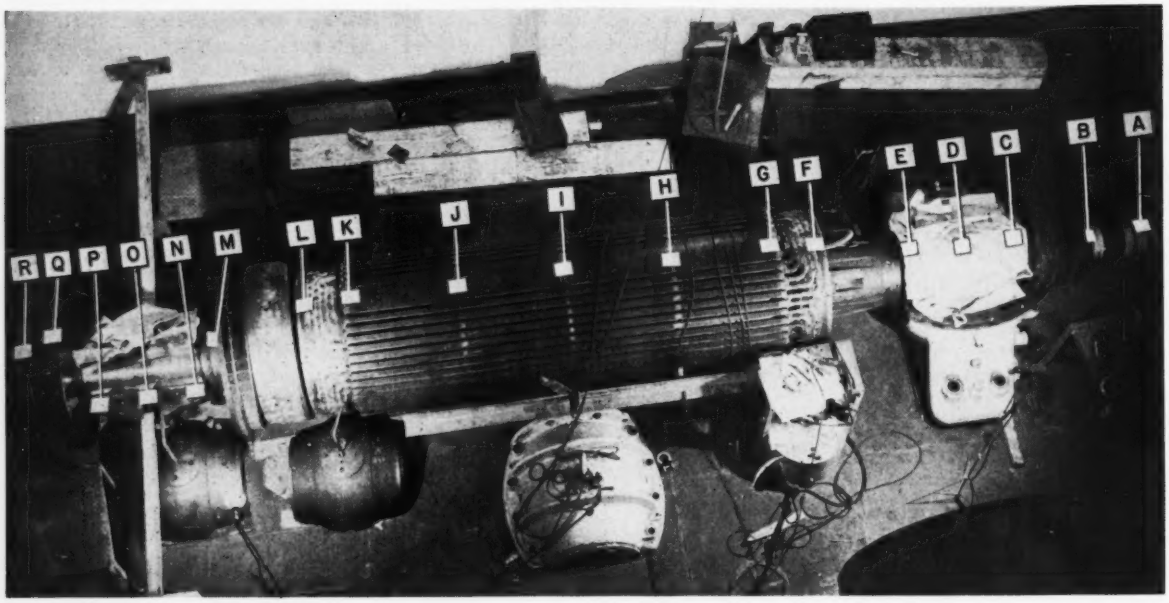


Mobile Unit Saves Buying Eleven Spares

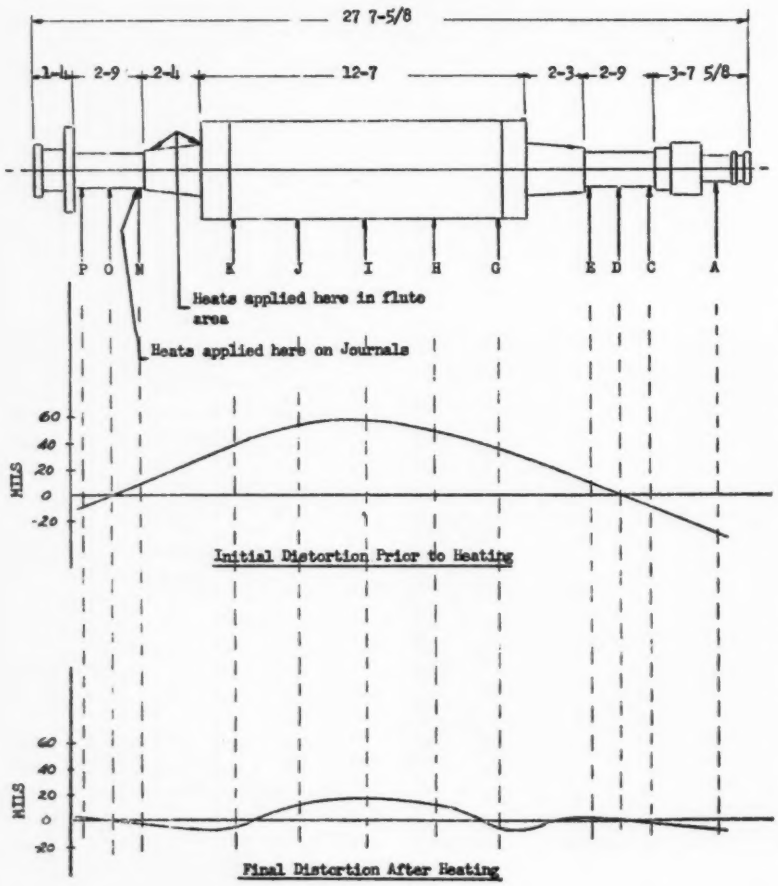
Mounted on a special 175-ton railway car this 83,333-kva mobile transformer will serve as spare for any one of 11 major substations on the Bonneville Power Administration's system. Weighing 377,000 lb, this traveling substation is believed to be the largest mobile unit ever built in the United States.

The railway-car-mounted spare can be rushed under special train orders to the scene of trouble, connected and operated without removal from the railway car. Thus the mobile unit will obviate the necessity of purchasing spare transformers for at least 11 major substations.

Nominal voltage ratings of the various windings are: high voltage, 220 kv wye; intermediate voltage (autotransformer winding), 115.5 kv wye; intermediate voltage (separate winding), 57.1 kv wye or 66 kv delta; low voltage, 13.2 kv delta. Westinghouse Electric Corp. was the supplier of the equipment.



QUICK FIELD REPAIRS were made to bent generator rotor by introducing offsetting bands at ends of the shaft to restore dynamic balance



ALIGNMENT GRAPHS of bent generator shaft lettered to correspond with the photograph above

Unorthodox

R. N. Sarver

Junior Mechanical Engineer
Southern California Edison Co.

In October 1952 the generator rotor of unit No. 7R at the Long Beach steam station of Southern California Edison Co. was subjected to overheating because of negative sequence induced currents when the generator operated single phase from mechanical failure in an oil circuit breaker while carrying full load.

This is a General Electric unit with the following name-plate data: 25,000 kva; 13.2 kv; 1,092 amp; 9 pf; 3 phase; 60 cycle; 1,800 rpm; type ATB (open air cooled).

The unit normally operates through a double bus and parallel circuit breaker connection to the system but temporary operating conditions made it necessary to isolate one of the buses, leaving the generator on a single bus with only one circuit breaker in service. The unit had been brought up to full load just prior to the bus switching. Shortly afterward the operator noticed that excessive current existed in one phase of the generator, as the ammeter was at full-scale deflection. Concurrently, the turbine operator observed abnormal vibration of the unit and smoke coming from the generator

air ducts. The unit was then quickly taken off the line and carbon dioxide injected into the generator. It is estimated that the generator operated single phase for about three minutes.

Damage Sustained

Subsequent investigation revealed that one phase of the oil circuit breaker had not been closed because of mechanical failure of a lever in the operating mechanism that accounted for the single-phase operation. Removal and inspection of the generator rotor disclosed evidence of serious surface overheating in certain areas as indicated by blistered varnish and blue oxidation colors on steel surfaces.

The steel retaining rings covering the windings at each end of the rotor were removed to permit inspection of the end turns. The insulation and wood blocking between coils was charred and the winding tested solidly grounded. It was noted that several brass wedges had been heated sufficiently to start plastic flow at the ends of some coil slots.

Procedure Straightens Shaft

The rotor was placed with the journals centered on the rollers of a portable Akimoff balancing machine and indicated for runout at twelve points. A maximum of 58 mils runout was indicated near the center of the rotor. The ends of the journals indicated approximately 10 mils runout. The longitudinal plane of the bend in the rotor passed through the coil slots between poles. The rotor was obviously badly out of balance.

The generator stator was inspected and the winding tested. It showed no evidence of heating or damage. The steam turbine was given a trial run and it also was undamaged and ran true.

Field Repairs Made

The coil ends were thoroughly cleaned after which the rotor winding withstood a 2,500-v d-c test to ground and further tests with a surge comparator indicated there were no shorted turns. The winding appeared undamaged in the slots so it was concluded that emergency repairs might be made by retaping the winding end turns, replacing the blocking between the coil end turns and refitting the end-turn retainer rings, then attempting to straighten the rotor and rebalance it.

It was recognized that, since the only practical method of bending the rotor to straighten it was by carefully heating and quenching small areas in the right places on the rotor surfaces, it would be impossible to take the bend out of the center of the rotor because of the field windings. To do so would require removing the winding and would take several months for the complete job. Moreover, the work would have to be done at the factory. The unit was urgently needed to be back in service not later than Dec. 15, 1952.

It was decided to attempt a unique repair by leaving the bend in the center section and putting compensating bends in the shaft ends. This was actually accomplished as shown in the accompanying diagram. The runout at the conclusion of the heat straightening was approximately 18 mils at the rotor center and 2 mils at the ends of the journals. The rotor was then put in a lathe and indicated to run true at the journal centers. A light finish cut was then made on each journal and the coupling face to obtain true alignment. It was not necessary to rebabbitt the journal bearings.

The rotor was then put back on the Akimoff machine and statically and dynamically balanced. There was some surprise in that the weights required were well within the limits of the normal balancing facilities provided in the rotor. The unit was reassembled and returned to service in advance of the Dec. 15 deadline.

In this instance valuable experience was obtained in connection with heat straightening and balancing of large rotors in the field. It was successful due to the combining of the technical experience of the manufacturer's advisers on the job with that of the maintenance experience of Edison field forces doing the work. As is generally the case when loss of capacity occurs within a power system, time was of the essence and it was advisable that emergency field repairs be made in preference to returning the rotor to the factory.

First U. S. Reversible Pump-Turbine Unit

The first large reversible pump-turbine unit to be used in the United States is now being built for the Bureau of Reclamation by the Allis-Chalmers Mfg. Co. It will be installed in the Flatiron power and pumping plant on the Colorado-Big Thompson project. In this power and irrigation project, water is pumped from the headwaters of the Colorado River on the west side of the continental divide and flows through a tunnel to the east slope, where a series of hydro plants utilize the 2,800-ft available head.

The reversible pump-turbine will be used primarily for irrigation, writes A. J. Casser of Allis-Chalmers, and will pump water from the tailrace of the Flatiron power plant into the project's Crater Lake reservoir. During periods when the pump-turbine is not used for irrigation it will operate as a turbine, driving the motor as a generator, and supply peaking power to the bureau's system in northern Colorado, Wyoming and western Nebraska.

The reversible pump-turbine is rated to pump 370 cfs at 240-ft dynamic head and will be used over a range of head from 290 ft down to 140 ft. The unit is unique in that it will operate at 300 rpm when pumping and 257 rpm when generating power, and will have a motor to drive the pump that will also serve as a synchronous generator. When operated as a turbine it will generate approximately 12,000 hp at a head of 290 ft.

The pumped storage system is an economically feasible method of supplying additional premium price power during peak load periods. In an average installation the ratio of return from generated power will be about 200% because of the inherent high efficiencies and the price differential between peak and low-demand periods.

Tests made by the manufacturer on a model of the pump-turbine have shown creditable efficiencies as a pump and as a turbine. Higher efficiencies are expected in the prototype under actual operating conditions. The same manufacturer has under construction a similar pump-turbine unit for TVA. As a motor it will be the world's largest, rated 102,000 hp at 106 rmp; as a generator it is rated 70,000 kva.

USBR expects the Flatiron installation to be completed this year.

RADAR-TYPE transmission line fault locator. Impulse sent out over line is reflected back to appear as a pip on the oscilloscope screen. Dial to right has two scales calibrated in miles. By adjusting the dial, fault location may be read to accuracy of one mile

Trouble Shooting the Electronic Way

R. L. Brinton Pacific Gas and Electric Co.

Since World War II considerable thought and time has been given to the development of electronic line fault locators. Some cost many thousands of dollars and some only eight or nine hundred dollars.

The most successful used on the Pacific Gas and Electric Co.'s system to date is a radar-type device designed to company specifications. This instrument is relatively inexpensive, yet is able to point to faults over 100 miles away. The basic instrument is comprised of an oscilloscope of high sensitivity with a linear variable sweep, plus a pulse generator that is synchronized with the oscilloscope sweep circuit. A 1,000-v pulse of one microsecond width is applied to the line under investigation at the start of the sweep. The pulse is propagated along the line at a velocity of approximately 98% of the speed of light.

At each impedance discontinuity a reflection occurs that sends a return pulse back for display on the oscilloscope screen. The time (distance) measured on the face of the oscilloscope between the initial and reflected pulse is a measure of the distance to the line discontinuity or fault. If the fault represents an impedance lower than that of the line (short), the return pulse is displayed below the trace; if the fault represents a higher impedance (open circuit) the return pulse is displayed above the sweep.

Tests 1 and 2 of Fig. 1 show the different indications for an open and shorted (grounded) line. Four sweep ranges of 5, 25, 50 and 100 miles are provided and a linear scale in the oscilloscope face permits interpretation with good accuracy between these limits.

To make very accurate measurements possible a marker generator is provided that allows the operator to move a step function marker out along the time base to coincide with the reflected pulse. This mark is controlled by a dial calibrated in miles and the distance is read directly from the dial. This feature, as shown in test 3 of Fig. 1, allows the distance to be measured to an accuracy of one mile. A sweep delay circuit is provided to extend the range of the instrument to 200 miles. With the sweep delay switches in, the sweep starts where the range dial is set and extends to a position set by the sweep range switch.

The instrument can be coupled to the power line either through standard carrier current coupling capacitors or by a .03-mfd, 25-kv condenser. A heavy current drainage coil of 100 to 500 mh inductance should be connected from the low-voltage side of

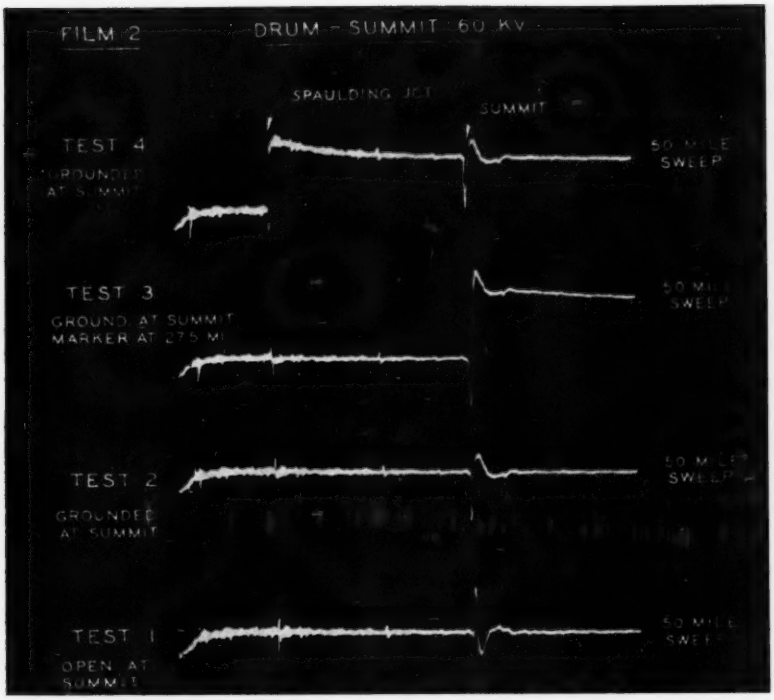


Fig. 1

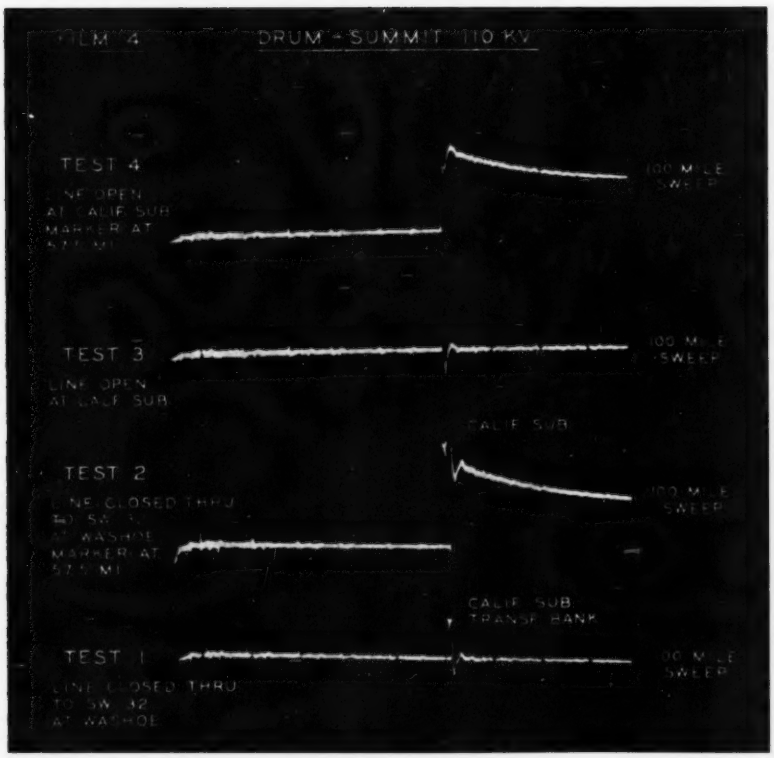


Fig. 2

FIGS. 1 and 2—Pictures of oscilloscope screen showing inherent irregularities of a particular line. These records are available for comparison when the line is in trouble. Taps, transformers, wave traps and metering equipment all cause minor pulse reflections

the capacitors to ground. It is also advisable to insert 5- to 10-amp fuses on the line side of the capacitors for safety purposes.

Since the instrument described here will probably have wide usage, it is considered desirable that operators and station maintenance personnel be familiar with its use. The best method so far found for simplifying operation is to take pictures of the oscilloscope screen when the instrument is scanning the line under normal conditions. Any inherent irregularities of the line will thus be recorded and available for comparison when the line is in trouble. This is important when lines of 60 kv and less are to be tested. Changes in configuration, taps lines, transformers, wave traps and metering equipment all cause minor pulse reflections that could give misinterpretation of fault locations. Figs. 1 and 2 are typical pictures of such lines, except that those in question have been opened or grounded at some distance from the testing end.

A modification of the instrument is now being considered for testing for faults on underground high-voltage cables. At present there is little equipment available in this field.

Sugar Cane Now Weighed Electrically

Weighing loads of sugar cane electrically is a new method devised and used by the Hawaiian Commercial & Sugar Co., largest sugar grower in Hawaii. A recording ammeter on the unloading crane motors registers the current taken. Weights are deduced from the obvious fact that the current drawn by the motors is proportional to weight of the load.

It is then a simple procedure for the unloading operator to note the number of amperes taken, compare that to the equivalent tonnage figures on a simple chart, and then record the tonnage. Checking the weights thus figured against scales in the mill yard shows the system to be much more reliable than that of employing strain gages on the gooseneck between the cabs of the big Tournahauler cane trucks and their trailers.

The tonnage-ampere charts include a compensation for all factors such as unloading nets and other equipment involved. Because there is no shifting of gears during unloading, the pull is constant and the peak is reached as the crane lifts its full load.

TROLLEY DUCT down center feeds the lithographic presses in a well-lighted pressroom

Printing Becomes Electric

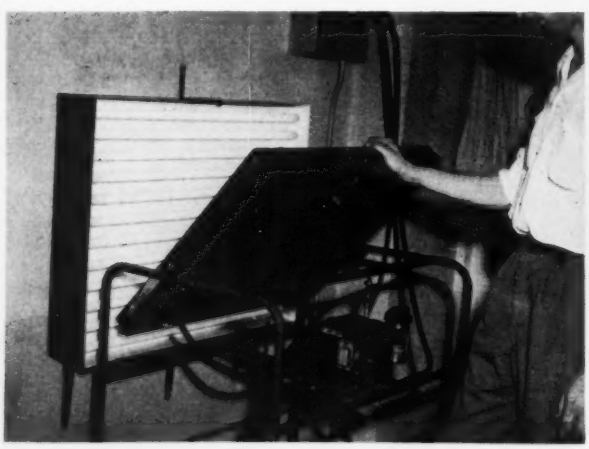
It is appropriate that the publisher of an electrical pricing guide should use electricity wherever possible in the process. Biddle Trade Bureau of Los Angeles goes even further. It uses an electric or electronic process to print with. This process is known as XeroX, developed by the Haloid Co. of Rochester, N. Y. Although used extensively for various copying purposes, this installation at Biddle Trade Bureau's Pico St. printing and shipping plant is the first user in the West to apply it to large-scale production.

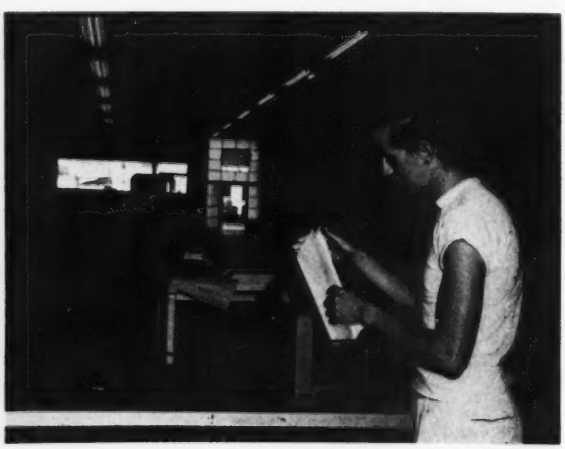
For Biddle Trade Bureau it is ideal, since it is equipped to print a million sheets a month to supply the subscribers of its wholesale price book, its contractors' or resale book, and the contractors' hand pricing book as well as sheets for Phonolog, a subsidiary company operating a continuous catalog of phonograph records. It is seldom realized that the organization has such a volume printing operation to perform. Recently it has opened a subsidiary in Chicago to distribute similar pricing guides for the east, most of which are supplied from the Los Angeles plant.

The extreme speed and flexibility provided by the XeroX method were what appealed to A. H. "Bill" Gudie, president of Biddle Trade Bureau. The XeroX equipment enables them to make a complete plate, ready to print, in three minutes from a typewritten sheet of price changes. The sheet then is printed on a multilith press. In this fashon it is possible to get out 250 replacement pages per week to each of the thousands of subscribers throughout the West and East. In servicing the industry with price changes, speed is paramount.

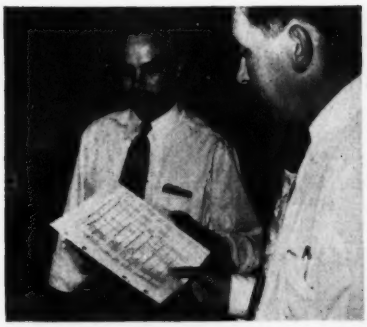
A second value is that it does away with the necessity to file and preserve masters or stencils for rerunning. It used to take a day a week merely for filing and the space required for masters was considerable. Now one of the previous sheets can be copied and put back on the press in three minutes. The accompanying pictures show briefly the simplicity of the process. It is unique in that no development is necessary. The entire process is dry and clean. Erasures can be made on the master. Copies turned out have remarkable qualities of clearness and legibility.

Hill Electric Co. of Los Angeles installed the wiring at the Pico plant. Outside of the usual good industrial installation, a feature is a 60-amp trolley duct installed over the line of presses to feed them. There are three multilith presses and one Davidson dual offset duplicator and press, which will either do letterpress printing from type or rubber plates. This is used to print form heads and imprint sheets with company names, etc.

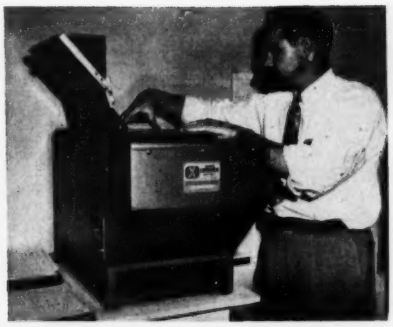




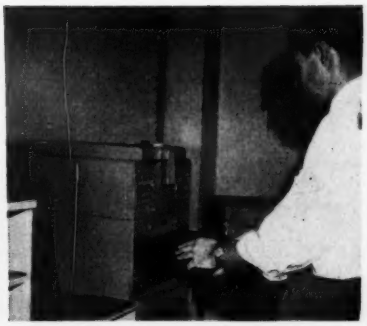
VACUUM FRAME exposure box used to reproduce government orders on presensitized offset plates. Electric jogger (right) for paper



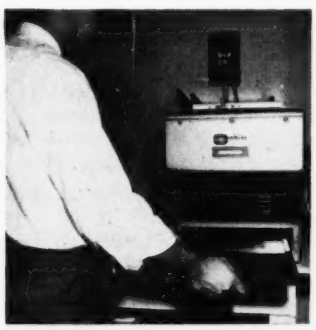
1 Bill Gudie (at right) hands John Simpson, plant manager, a revised price sheet in the form of a "paste-up." The date and revised price column have been retyped and Scotch taped into place, saving retyping entire page. This work sheet is to be photographed and reproduced on a master for lithographic process



2 The work sheet to be copied is positioned on glass plate of the XeroX camera. The camera has a wide-angle, fixed-focus lens and a removable yellow filter used on blue. At the bottom is an aperture in which the plateholder is inserted. Timer on the side controls the exposure, which varies from 10 to 30 seconds

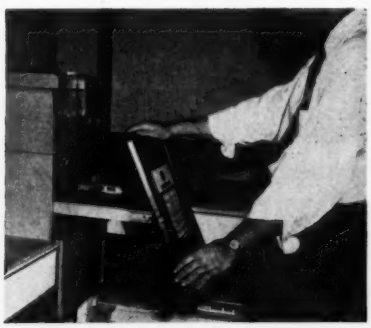


3 Photo conductive plate is sensitized in the copier by corona discharge from fine wires which pass over the plate. Reversing polarity of voltage applied to the wires reverses the sign of the electric charge on the plate. Potentials from 4,000 to 7,000 v produce the corona discharge, charging plate in about 10 seconds

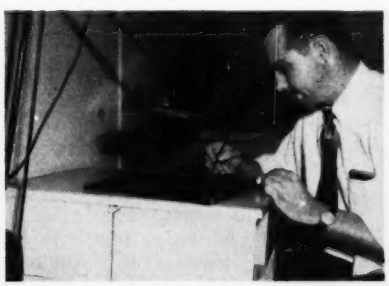


4 Charged plate is put into camera and protective shield removed for plate exposure. In area where light strikes plate the conductive coating acts as a conductor for the electrostatic charge and disperses the charge into the supporting medium, leaving a latent electrostatic image on the plate surface. It is invisible at this stage

5 Plate is now placed face down into "developing" tray, which contains a special developer used to bring out the latent electrostatic image on the plate. This is a mixture of micronized resinous powder and a relatively large particle size granular carrier and is entirely dry, requiring no wet solution in the process from beginning to end



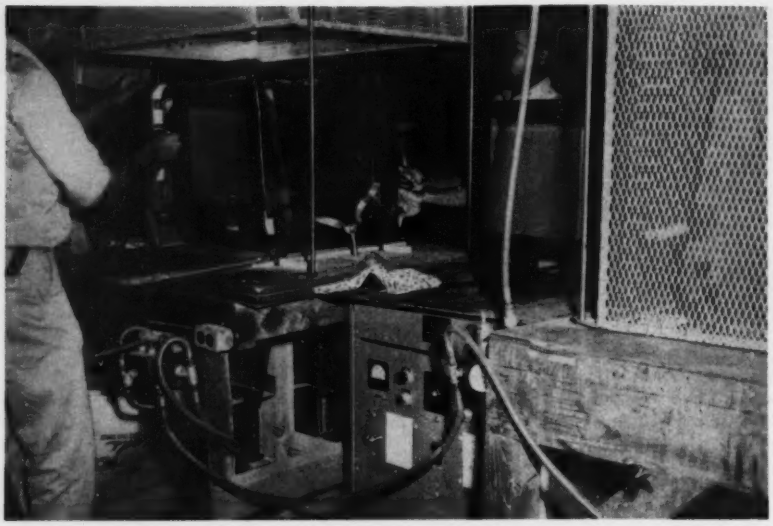
6 After plate is put in the developer frame and slide withdrawn the image is developed by cascading the powder over the surface of the plate. This is done by tilting the tray back and forth. The invisible electrical image is changed into a visible powder image on the XeroX plate surface. The plate may now be opened to view



7 Until electrical image is fully developed, no light must be allowed to strike the plate surface. When developed the plate may be exposed to light and any clean up or deletions may be made then by brushing away the developing powder. The powder image is now ready to be transferred to the duplicating master on a sheet of paper

8 Master of a special treated paper is placed face down on top of the developed powder image. Then the master and plate together are placed into the original charging mechanism or copier. Upon receiving the static charge the master attracts the loose developer powder from the plate's surface, thus transferring it to the paper

9 The master sheet of paper with the powder image now on it is then baked for a few seconds in the fuser. This heat treatment permanently fuses the powder to the master. After fusing, the master is ready to be applied to a duplicator and multiple copies made from it. The plate is cleaned by flowing cleansing powder over it in a tray (see cover)



BENT AND SHAPED, preprinted masonite wrap-around is clamped and electronically glued

HIGH FREQUENCY GLUING made possible production line output of inexpensive TV cabinets

Finish First – Glue Last

Lewis B. Reed

Industrial Heating Consultant
Los Angeles Department of Water & Power

The eye is far more critical than the ear, thus imperfections in reproduction of sound, which go without notice in radio receivers, are not at all acceptable when translated to the viewing screen of a television receiver. Makers of radio receivers for the low-cost markets, because of this, are able to cut circuits down to bare essentials, build a low-cost radio with passable quality, and have little trouble selling them. Television receivers, however, are complicated and need complicated circuits to produce a good picture, and even then buying the most expensive set is not a guarantee for enjoying 100% trouble-free viewing. That is why customers take out a service policy for fifty or more dollars a year.

Television receiver manufacturers find it almost impossible to build a low-cost line by simplifying circuits. Any cost reduction has to be done by making a less expensive cabinet. Of course, this was true to some extent in radio's heyday, the day of period cabinets when radio receivers were sold as pieces of furniture. The cabinets of today's television receivers are not the expensive period pieces of yesterday's radio cabinets, thus any cut in cabinet quality is likely to leave only the barest of essentials.

Pacific Board Fabricators specialize in masonite fabricating, and have recently been building a masonite table-top TV cabinet for a well-known television manufacturer. These cabinets are being turned out at a rate of 180 per eight-hour shift, by one small production line—180 attractive cabinets, both inexpensive and strong. The cabinets are made with a one-piece masonite wrap-around for sides and top, which is glued to the frame after the application of the finish. The grained finish is applied to the masonite by offset printing, which, of course, has to be done while the masonite is laid flat. After bending and shaping, the wrap-around is clamped to the cabinet frame and glued. The problem was to put the gluing on a production basis, where one cabinet would complete the gluing and glue curing operation at least every two minutes—all without damage to the offset printed grain finish.

PEECO Corp. of Los Angeles installed one of its 1½-kw output dielectric heaters, altered for two-station operation. Required production is maintained by applying the glue and adjusting the jig-mounted electrodes to one cabinet, while the glue of a cabinet at the second station is being cured. Curing time of 75 seconds is automatically controlled. Tests made on the strength of the glue joint 15 minutes after the cure have proved the masonite will break before the joint separates. Dielectric glue curing is not new, but completing the operation to a piece with the finish already on it without damage to the finish is certainly noteworthy.

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Except for big jobs in progress new construction is a bit slow starting despite favorable weather and predictions that construction totals for the year will equal last year. The new administration put a stop-and-think order on many projects for defense until it could review facts and appraise whether they were really necessary. — **Whoa!**

Much more new house building is necessary for the increased population and especially to take care of the migration Westward still going on. But mortgage money is also tightening up and building costs are so high it dampens enthusiasm somewhat. Tract builders are trying to scheme new ways to build up quantity so as to be able to offer houses at prices people will pay—ordinary people, that is. — **House prices**

No help from the unions is forthcoming as wage controls went off and a wave of wage and welfare demands broke through the dyke. Instead of trying to hold the line at present levels and working for ways to prevent a decline by seeking new methods and higher efficiency, the idea seems to be to get as much as possible while manpower is still tight. Price rises in gasoline, cigarettes and others are used to justify wage demands. Other construction craft welfare grants, whether sound or not, are levers for demands in the electrical trade. But it all adds to the cost of construction and discourages private building. — **Still demanding**

Price control on construction and repair services (CPR-93 and CPR-34) were removed but that on construction materials over the counter (CPR-67) had not yet been at press time, although its life is a short one. Everyone is cautioned, however, to keep records for at least two years lest some government department decide to make a check back over them. Whether contractors will now up the selling price of labor to what they claimed should be added for past wage increases as legitimate overhead is up to each contractor as an individual. Any agreement on that now would be considered collusion. Pricing is back on its own by each business. The ceilings acted as uniform price agreements. — **No lids now**

When wage controls ended so did the review of agreements by the Construction Industry Stabilization Commission. So any reluctantly made agreements, submitted to CISC in the hope that it would turn them down as unstabilizing, automatically go into effect. — **Buck passed back**

Square D is touring the West with a display and demonstration coach in which is shown and demonstrated the latest in its line of distribution and control equipment. In San Diego territory it was being featured in four showings in that city and Escondido and Oceanside, late in February, with the cooperation of the Electrical Contractors Division of the Bureau of Home Appliances. Before long it will be seen in a regular tour throughout the West in cities and towns. — **Show on wheels**

Aluminum prices did not jump when decontrolled. With a big differential already between aluminum and copper the added spread may well be the most potent force in converting the industry to greater use of aluminum wire and less of copper. Economics persuades where reason fails. — **May cash in**

CMP went "open-ended" as NPA decided there seemed to be a growing quantity of most all materials for both defense orders and civilian production. The controls are eased gradually but contractors may purchase wire on nonrated orders and use such wire on construction that is not an "authorized construction project." Wholesalers can purchase on nonrated orders from the mills if the mill can ship without interference rated orders. Top priority orders will still get first call. — **Enough for both**

Solder, which contains tin, can now be bought without a certificate of use. NPA revoked Order M-8 and there are now no limitations on purchase, inventory or use of solder, regardless of grade or tin content. — **Loose again**

Price voltage

Copper took a jump the minute the lid was lifted. This caused a rush to load up again and hence an artificial shortage in an already tight situation. Producers had long been under unequal pressures to hold to the ceiling price as foreign copper was allowed a bigger price than domestic and wire mills had to juggle both and come out with wire prices set somewhere in between. It was only natural that domestic copper price would push upward then when control lifted. Contractors with long jobs to finish or some bid at old prices but not yet started also naturally rushed to protect themselves.

What is expense

A jolt was given contractors in a ruling by the Director of Internal Revenue in San Francisco in respect to travel expense, travel time and subsistence. He pointed out that tax law does not require withholding from amounts paid for traveling or other necessary expenses but that such must be properly identified by making a separate payment or by indicating the separate amount where both wages and expense allowances are made. If an employee is paid more than $600 of such wages plus expense allowances the employer must report it. Then the worker can deduct on his income tax return the actual cost of his expenses. If he eats at home each day his meals are not deductible.

Time is wages

Travel time, however, is considered wages and subject to withholding. Where travel expense and travel time are combined in an allowance, he said, a reasonable allocation would be acceptable.

No escape here

Here's the catch though. The Bureau of Internal Revenue holds though that allowonces paid by an employer to cover travel time, travel expense and subsistence are wages as far as Federal employment tax and Federal insurance and unemployment tax are concerned. This ruling was given to the Sacramento Valley Chapter, NECA, on Feb. 11. It complicates the bookkeeping on the pay roll still more.

Inspectors' wish

Plug-in type of circuit breakers that cannot be interchanged for those of higher rating, an attribute electrical inspectors have been demanding, are now available in Square D's XO line. Different widths for each rating prevent uprating. Inspectors feel that without such a safeguard, overeager dealers or householders may put in 30- or 50-amp breakers when the originally installed 15 will not take the load, but neither will the wire in the walls.

Tomorrow's business

Interested in electronics components of any kind? The opportunity to see more kinds and uses for such will be afforded at the 1953 Electronic Components Symposium to be held at the Shakespeare Club in Pasadena, April 29-May 1. A. M. Zarem, director, Los Angeles division, Stanford Research Institute, is general chairman. Affair is sponsored by the RTMA and the West Coast Electronics Mfg. Assn. . . . There'll be a National Electronics Conference at the Sherman in Chicago, Sept. 28-30. Then the Western Electronics Show and Convention will be held in San Francisco municipal auditorium, Aug. 19-21.

Win three ways

A lighting competition for electrical contractors is under way, with a special invitation to contractors of the West to enter. It is sponsored by Electrical Construction and Maintenance magazine which will make 18 awards for entries considered best by an independent board of five judges. The contest closes Aug. 1, 1953, and details of the competition are in the January issue. However a brochure with full particulars and an entry blank are available to any who write for it to Berlon Cooper, lighting competition chairman, Electrical Construction and Maintenance, 330 West 42nd St., New York 36, N. Y. First six winners receive $100 cash, printing of the entry in the magazine and 500 reprints of it for distribution; other prizes are in proportion.

Product school

Allen-Bradley Co. held a sales school for its southern California representatives for two days at Huntington Hotel, Pasadena, with L. C. Watson, sales manager of distributor sales, in charge, assisted by H. D. Easterbrook, Los Angeles district representative. Attending were inside and outside sales personnel of Electric Corp., Los Angeles; Gaines Electric Supply, Long Beach; Orange County Wholesale Electric Corp. of Santa Ana; Soden Wholesale Electric Co., Riverside. Talks were illustrated with the Vu-Graph, which showed motor control applications and details. An examination concluded the school. A graduation dinner followed at which prizes, personalized cigarette lighters and club buttons were presented to those who took the course.

Reshuffle jobs

Westinghouse is splitting the apparatus and supply activities from the appliance distribution in its Supply Co. As a result these changes were made in the North Pacific district with headquarters in Seattle. A. L. Wiegenstein was named district manager, apparatus and supplies. W. M. Jewell is district manager, consumer products. E. R. Constable is the district apparatus and supply sales manager. E. C. Whitlock has resigned as branch manager at Yakima to enter the radio-TV business. He is succeeded by R. H. Fewell, formerly apparatus and supplies sales manager of the Tacoma branch.

New reps.

Auth Electric Co., makers of signal equipment, are now represented in northern California by the George Gray Co. and in Los Angeles by Pomeroy Co., both of whom were former Edwards representatives until factory branches were established. Another line Gray will now handle is that of Porcelain Products Inc. of Findlay, Ohio, for its low-voltage line of products.

Moves

Harry Herning announces the moving of Herning Co., wholesale electrical supply distributors, to 1178 Folsom St., San Francisco 3. Same phone.

Also

H. J. Randolph Co., representing S&C Electric, Nelson Electric Mfg. Co., T. J. Cope Inc. & Rakit Corp., Trans-Sonics Inc. and Electrical Mfg. Co. in the southern California area has moved to new and larger quarters at 736 Santa Anita St., San Gabriel, Calif. Randolph and Doc Yarnell say they will now be able to make most items available from local stock.

Men move too

Sylvania Electric Products has transferred Charles Brady Jr. to Wheeling, W. Va., as national fixture sales manager and Bob Harper, former district sales manager of the central Pacific region, will take his place in Los Angeles. William Friend moves to San Francisco as district sales manager of the central Pacific region. John Orsi from Chicago takes Friend's Los Angeles post.

Like PCEA

Also moved out of the Edison Building, the South Pacific sales district of General Electric Lamp Division is now in the Tishman Building, 3450 Wilshire Blvd., Los Angeles.

In civies again

J. Walter Howard, returned from a tour of duty in the U. S. Army, has been made the San Diego representative of the General Electric Co. Lamp Division, South Pacific sales district.

Comes West

Corning Glass Works has made Harold E. Gumbart Western district sales representative of the new products division with headquarters in Los Angeles. He had been senior sales engineer for the division, was in the insulation division and electronics sales department of the electrical products division.

About people

"Scuttlebutt" from the IES Southern California Section notice includes: Milton Weiner, former district manager for "All-Brite," is now sales manager of Ruby Lighting. Roy Bevin, formerly with So. Calif. Edison, now is with Sunbeam Lighting in its photometric laboratory. Don Farquhar of Edison will be transferred from Redondo to fill the Beverly Hills vacancy. Bill Bracken has taken on the Brown-Boveri Corp. lines.

Backfield shift

Changes and transfers have caused changes in the Southern California IES officers and committeemen too. Edwin Blair of Westinghouse will take over as secretary of the section as D. W. Prideaux, G-E Lamp, becomes program chairman and Rodger Delander of Sylvania is appointed to the board of managers.

Visits chapters

Rudy Scherer of Indianapolis, national president of National Industrial Service Assn., will be visiting with chapters of NISA in the West on a tour of the region during March and April. He is booked to be at the meeting of the Los Angeles Chapter on March 24.

Safety appeal

Santa Clara and San Benito Counties Electrical Contractors Assn. is preparing a promotion for electrical contracting tied around a Safety Week, in which the public will be urged to remove unsafe cord wiring and to get contractors to install safe additional circuits. The program is being prepared by Manager George Harter to be run in May, with newspaper and radio publicity and industry tie-in.

Change plans

The annual convention of the Idaho State Electrical Contractors Assn., which was to have been held at Twin Falls on Feb. 13-14, was postponed at the last moment and no new date for it has been set. A bill to repeal the Idaho State Electrical Law, introduced at the behest of four contractors in two sparsely populated counties, had little chance of receiving much support as the public and the electrical industry in Idaho have been well satisfied with the sincerity of its administration.

Young blood

A linemen's apprenticeship joint program by the National Electrical Contractors Assn. and International Brotherhood of Electrical Workers has been started by the Northwest Line Constructors Chapter of NECA. Two classes have started, one in Portland, the other in Seattle. Enrollment is limited to 17 per class. C. D. Casey heads the Seattle committee, with Dave Keiman, Local 46, and Homer Bergren of Smith & White. The same texts will be used in both Oregon and Washington classes so that apprentices may transfer. Area of jurisdiction includes northern California, northern Idaho, all of Oregon and Washington, for linemen's locals 77, 125, 483 and 695.

Big time powwow

First North American Conference on Apprenticeship will be held in San Diego in Balboa Park, Aug. 2-9. Attendance is expected to run to over a thousand representing labor unions, business, management, education and government, with the aim to make apprenticeship training more attractive, develop standards, improve skills, foster cooperation. Joe Bollinger, NECA chapter manager, is on the local committee.

Returned

Earl Pridemore was installed for his second term as president of the San Diego Chapter, NECA, at a dinner March 2. A. W. Myers was named vice-president; Charles Sieger, Owl Electric, secretary-treasurer; and A. C. Eddy, Ets-Hokin & Galvan, the governor. Joe Bollinger is manager.

Agin' the law

Montana's proposed electrical licensing law, sponsored by the Montana Chapter of NECA, the IBEW, electrical inspectors association, was killed in committee along with similar bills for architects and real estate operators, the legislature being set against new licensing laws. Opposition came from lumber and hardware dealers who thought it would affect over-the-counter sales of materials and appliances. In spite of offers to amend the bill to eliminate this chance interpretation the committee discarded the bill.

Bigger place

Joseph Liner, Pacific Coast representative for Rodale Mfg. Co. and Chester Cable Corp., announces a new office and warehouse at 338 E. 2nd St., Los Angeles. His former address was 1827 S. Hope. A complete stock of the Rodale line of wiring devices to serve accounts in California, Arizona, Oregon, Washington and Nevada will be there. A Chester Cable stock will be carried also in the future.

Gala affair

Peninsula Electrical Contractors Assn., a branch of San Francisco Chapter of NECA, honored William Klose as it returned him for another term as president of the group. The occasion was a big dinner dance at Peninsula Country Club, Feb. 28. Other officers are William Kennedy, vice-president; E. A. Mueller, treasurer; directors Seth Cohn, who was presented a certificate of appreciation for his service in apprenticeship training, and Gene Coconi. W. J. Varley is manager and Mrs. Clelia Maoli, returned from an illness, the executive secretary.

Elected

Fresno's chapter of NECA, the East Central California, elected Bert Demmon as its president to succeed W. W. Pollack. E. Caglia is governor.

Recognized

Los Angeles Chapter, NECA, honored one of its hardest workers and longest time members, Herbert Evans, by making him president. He succeeds Richard Arbogast, who has been president, governor and has held other offices. Sidney Hill, a former president, was named governor and treasurer.

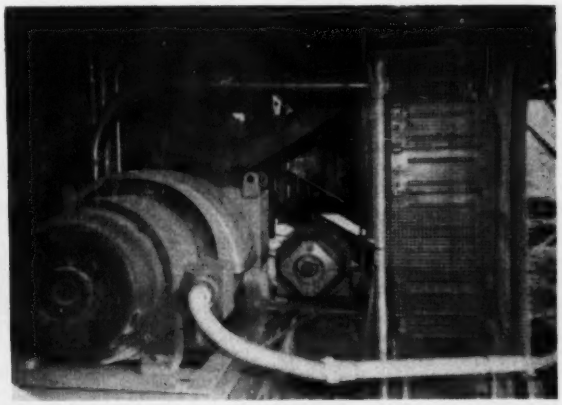
Let down their hair

Unusual and mutually beneficial joint meeting of Northern California Chapter, NECA, and the East Bay Chapter, American Institute of Architects, in Oakland, March 2, and with consulting electrical engineers invited and participating, resulted in answering some 14 controversial questions submitted from the three groups by a panel of contractors, engineers and architects. Vic Perera, Walter Vance and Ed Buttner presided.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 88

SUBJECT: Electric Carriage Drive for Sawmill
CUSTOMER: Roy Wells Mills, Dayville, Oregon
TYPE OF BUSINESS: Sawmill
SERVICE COMPANY: California-Pacific Utilities Co.
DATA SHEET PREPARED BY: W. P. Riordan

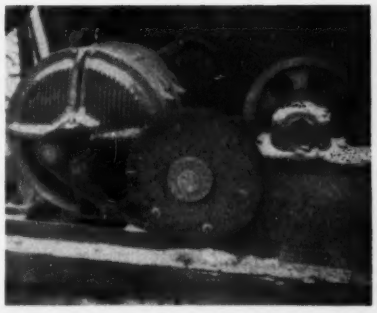


SMALL SAWMILLS of the type shown at left lend themselves ideally to all-electric operation. Right: M-G set on electric headrig drive

Much of the timber in the service area of the California-Pacific Utilities Co. is in smaller tracts where electric service is available. This situation lends itself to the installation of all-electric sawmills. Such installations are lower in first cost, generally cheaper to operate and easier moved to other locations. These were factors in the consideration of the location of the Roy Wells 100% electric mill at Dayville, Ore.

The Roy Wells mill employs electric drive in the operation of the log carriage, the vehicle used to carry the logs into the main saw. These carriages are usually propelled and controlled by steam, compressed air or a series of mechanical clutches. The Wells mill uses a 75-hp motor to drive a 100-kw generator, which supplies d-c service for a 75-hp d-c reversing motor, which is used to propel the carriage forward and back by means of a drum and cable. Control of d-c motor is by a rheostat taken from a Navy cruiser, where it was used to catapult planes from the ship. Some of the other electric equipment in the mill is war surplus also. The principal equipment is shown in the box.

Speed and flexibility attained by the electrically driven carriage is credited with being a substantial factor in the production of 40,000 board-feet in an eight-hour shift at this mill. The mill has a single-cut band saw, capable of sawing a log 5 ft in diameter and 24 ft long.



Most of the logs, however, are 16 ft long and will average approximately five to the thousand board feet. The carriage moves into the saw at a rate of approximately 140 ft per minute, with the return at a speed of 180 ft per minute.

A comparison of the cost of electric operation of the carriage drive against steam or compressed air is not available. It is known, however, that the electric drive had a much lower first cost and has a lower operating cost. In two years' operation, practically no maintenance has been required on the control equipment. Mr. Wells is well satisfied with the electric operation.

Electric Mill Equipment

A-C Motor	Generator	D-C Motor	Exciter
F & M motor, 75 hp, type OZK, 3 phase, 60 cycles, full load rpm 1,170, 220/440 v, 178-89 amp	Delco General Motors, model 1-3622, 100 kw, 120/240 v, 417 amp, 1,200 rpm, starter shunt wound, Navy contract No. NX 3,935	G-E, 75 hp, type H, catapult, shunt, d-c motor, reversing	G-E exciter, model 96A806, d-c, type CDM, 230 v, 20.8 amp, 5 hp, speed 850, totally enclosed

Electrical West—Vol. 110, No. 3

Where Is Self-Respect?

Clamor for welfare without contributing to it is making mere tools of electrical workers, in this contractor's opinion

Is an electrical worker no more than a chattel to be bargained over and kept? This is a moral aspect of the current demand for health and welfare plans by the unions.

The following is a forthright discussion of the subject by a contractor. He is an old-timer in the business and has always been sympathetic to unions and generous in wanting to improve the living standards of workmen. Too bad his name can not be mentioned because, to the shame of the status of free speech in industrial relations and despite protestations by union leaders to the contrary, certain reprisals might be visited upon him for speaking his mind freely. What he has to say, however, needs to be said and thought about, both by leaders of labor and by employers. If they are to be allowed to think, electrical workers should likewise re-examine this issue in the light of their own self-respect.

The contractor's thoughts are as follows:

Electrical workers are more than tools. They are human beings even though their bosses are asked, not by the workers themselves to any great extent, but by their representatives or their negotiating committees, to be treated in the same manner that employers take care of equipment and tools. They must be maintained, so as to be in good shape to work, through health and welfare payments in the employees' behalf.

Employers too are human beings. Many of them have been electrical workers in the past. Now that they have become employers they are asked to pull out of a rut those other employers who do not have the ability to be efficient as employers and likewise to restrain those who are too smart to take the responsibility an employer should take and who make personal gains at the cost of their workmen.

Labor has been told, pleaded with and shown in more ways than one that many of the tactics used by the unions lead to economic failures and to duress among their members. There is no doubt that labor leaders have worked their memberships into a corner. The normal individual worker with a family can no longer sustain himself at the wages he is receiving, high though they are, and seems to feel the need of such assistance as a health and welfare plan may offer.

Pertinent because health and welfare plans are demanded in wage negotiations today

This is a sorry situation, when a family man must submerge his natural pride of being able to take care of his family and himself through his own abilities; when he must ask his boss to do this for him.

It is indeed regrettable that the skilled American worker, such as an electrical worker—with his great technical know-how—can be led to believe he should not be concerned in such matters as his own responsibility for health or life insurance. True, it might call for a small sacrifice on the part of his whole family to meet a small financial obligation for this purpose.

Once upon a time, if the boss suggested taking care of a man's family he would be insulting that man and might even get a punch in the nose for such thoughts.

How are the employers going to prove to a worker and his family that anything obtained for nothing through a labor organization is going to develop into further hardship after it has hurt everyone else and his family? What more proof is needed when the worker today says: "I got more for my money (wages) in 1939 than I get today"?

This is the situation the employer finds himself in today. He is bound by signed contracts. How can he get the money for increased wages or for health and welfare plans from the jobs he has signed contracts to do for a certain stipulated sum?

He can only get this money by adding it to his cost of doing business or increasing his overhead costs. For he must pay out on contracts on hand. He must double the cost for any new work in order to pay the increase on the old work. Is that fair to the new customer?

It is this simple:

The corner grocery store, where the worker's family does its buying, requires some electrical work. The electrical bill for labor and material will also have this extra cost included. The electrical bill is a little more than the groceryman had set aside to pay for the work. Either he doesn't have it done or if he does he must charge all his customers a little more in order to get the money to pay the electrical wiring bill. The trouble is that when the grocer charges a little more it is a lot more than the housewife expected to pay.

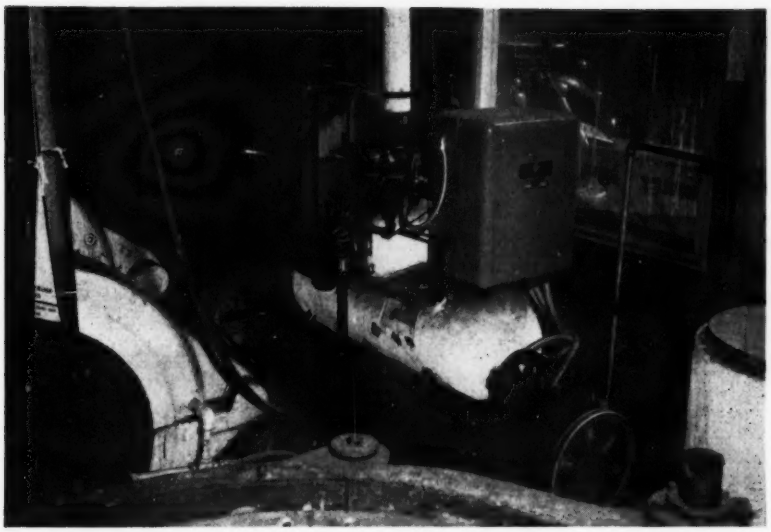
The growth of American business has been based on selling more goods to more people at less cost. In order to do this the employers figure out all the ways they can to save customers money by using all the knowledge, skill, tools and methods that American industry offers.

Then labor figures out every way possible to increase the cost to the customer without applying knowledge or consideration of anything that American industry offers. Workers being in the majority are themselves customers and they have also to pay for this stalemate.

When labor leaders realize that all they have to say to management is, "We would like to improve our conditions without increasing costs too radically. How can we go about doing this? How can we improve a costly situation that exists by offsetting it with some better methods?" Every advance that a workman could make from this kind of thinking would be a benefit to himself, his employer and the public.

And as for health and welfare plans at the expense of the employers, should these come by coercion or should some sound and rational basic plan be worked out that will give workers good wages and from reasonable working conditions afford them opportunity to contribute a part of their earnings to a welfare plan, one which does not affect the economy too greatly at one big bite?

Most important of all, it seems to me, is for the electrical worker to be a party to the welfare plan in which the employer feels justified in contributing also. This makes *partners*—not *beggars* asking for a handout.



SMALL SPACE only is needed for compact electric steam generator and control equipment that . . .

Pays off in More Tire Recaps

Control offsets costs and turns out a better product at the tire recapping plant of Muligany Tire Shop, Mill Valley, Calif., where North Bay Electric Works engineered, built and installed an electric steam generator to replace former gas equipment.

The electric steam generator has many potential uses in providing heat or steam for hospitals, dairies, baby formula plants, plastic molding or steam for sterilizing. In this particular case the steam is used to heat molds for tire vulcanizing.

Under the old method it was necessary to figure 1½ hp for each mold, as molds were added. Originally in this shop it took 12 hp in boiler capacity but Joe Lamperdi, North Bay Electric Works engineer and proprietor, is accomplishing the same result with 6 hp. First, he converted the heat requirements to a Btu basis. From his calculations he figured that with the better electric operating characteristics he could do the job for the tire shop with 60 kw or the equivalent of 6 hp, one-half the capacity of the gas-fired equipment. Moreover, he could divide the 60 kw into two 30-kw units, one operating most of the time and the other as a booster, and thus keep the demand from peaking.

One of the side benefits was that it used to take two hours to heat the molds and they had to be kept hot all day long. Now with the electric equipment it takes 50 minutes in the morning from a cold start. Moreover, the proprietor does not need to be there to start the boiler because an electric clock turns on the current and when the shop is opened the molds are ready to be used. If the volume drops off during the day molds can be turned off as not needed because it does not take a great deal of time to reheat them.

With the new equipment the shop can run an extra round of tires a day and has not yet lost a tire from a cold spot in the molds.

As to costs, experience so far has shown about a 25% increase in electric cost over gas but the tire company is getting eight extra tires a day from the molds. Another benefit not counted in the cost is that the proprietor does not have to get there at 6 a.m. as he formerly did.

The generator is fully automatic. It consists of a well-insulated pressure tank with two banks of 30-kw immersion units. Auxiliary equipment includes a pump on a solenoid-operated valve, which returns the condensation and furnishes additional water as needed. The water is in a closed system and very little new water is required. Since pumps were found to corrode at operating temperatures, and even a nylon pump went to pieces, a gear pump is used. Condensation is gathered in a drum to retain the water and to return it to the cycle.

Other electric equipment includes magnetic contactors and pressure control, a low-water cutout and water-feed control. One contactor takes one-half of the elements, the other the rest, and a separate magnetic switch operates the pump.

North Bay Electric has also designed such heat generators for other applications, using a synthetic or high-temperature oil instead of water where heat of even control is required and no hazard or pressure is involved.

Heat the Farmer too

Heat lamps are being used to heat dairy barns to keep the cows comfortable; in the pig brooding house to keep piglets warm in cold weather, in chicken houses to protect baby chicks from cold. How about the farmer himself?

At the suggestion of Harold Harms, B. C. Electric Co. farm service representative at Abbotsford, Farmer E. C. Brogaard tried out a simple four-lamp rig pictured below. A four-foot-square frame of 1x4 lumber mounts four outlet boxes and porcelain sockets. Swivel sockets are used with the lamps to allow them to be turned as desired to direct the heat. The entire rig was fastened to the ceiling over the wash-up area in the dairy.

In its *Farm Service News* B. C. Electric has given farmers much good advice on uses for heat lamps and stressed safe installation, quoting precautions spoken by the provincial inspector of electrical energy. The difference between the hard glass and ordinary glass heat lamps was told in the *Farm Service News* article.

HEAT LAMP rack on ceiling keeps farmer warm

ELECTRICAL WEST

Abstraction and Advice

MUCH can be learned from the industry's elder statesmen before they are completely shelved by the inexorable rules of retirement. One of them was speaking recently to a group of comparative youngsters — all of management timber — about abstract studies and we were privileged to listen.

Gist of his remarks was that there must be a more speculative and imaginative approach to the field of utility engineering as it applies to the utility system as a whole. Utility management should recognize this and prod the engineers to give the subject the abstract study it warrants. He observed that people in top management positions know the need for and value of putting one's feet on the desk and just dreaming about problems on some occasions and about nothing in particular on others. It is from such dreaming that new techniques, new approaches and new policies come, he pointed out.

Some one asked him to define abstract study. Instead, he defined abstraction — a bunghole without a barrel. "System development will come about," he said, "when bright young engineers are encouraged to look at a bunghole and build a barrel."

A. A. Potter, dean of engineering at Purdue University, recently gave the industry somewhat similar advice. He said, "What we need today is less aping and more monkeying."

Time to Merge

THE road of the Puget Sound Power & Light Company in endeavoring to work out a satisfactory sale of its properties has been a long and thorny one. One pitfall after another has wrecked deal after deal. For a long time it appeared certain that this great private utility with its long history of progress and development would go over completely to public ownership. In fact no other course appeared reasonable or possible.

Now, however, there has been a change. Washington Water Power Company, having worked itself out of a somewhat similar dilemma, proposes that the two properties be merged. Until its own fate was determined it could not advance such a proposal. For a time also Puget Sound Power's commitments were such that it hardly could entertain one.

That, too, has changed.

Merger negotiations are now under way. The outcome of these discussions cannot be predicted. However, most of the electrical industry here in the West, and all of the friends of both of these fine utilities, hope they will find an equitable basis for merging the two properties and preserving Puget's properties as part of a business-managed, investor-owned utility.

Price Lid by Choice

WITH the lifting of price ceilings by the new administration, perhaps it was only realistic to expect prices to rise, but was it wise? Such is the intricacy of operating a business these days that the cost of merely holding the doors open keeps inching upward. Such is the tax take by the governments, from federal all the way down to each local town, that money to make even prudent improvement is not available, perhaps, except by way of a price increase. Such is the reasoning of the oil companies and the utilities which have recently asked for increases. This is despite good showings of earnings under the price regulations.

Yet such involvements of finance are seldom understood by the public or the daily press. It is easy to jump to the conclusion that the minute the lid was lifted the oil companies raised the price of gasoline and cigarette companies the price of fags—two items that touch the most Americans in the pocketbook the quickest. Such a hurry to raise prices, whether justified or not, certainly looks bad to the public.

Moreover it gives backing to the demands of unions for more wage increases because of increased cost of living. Thus the pres-

EDITORIAL VIEWS

sure under inflation keeps building upward.

How much better and more statesmanlike it would have been for all business leaders, who have been asking that regulations be removed as unnecessary, to make a strong stand to stabilize prices at the present level. They could ask labor to stabilize wages also and to try to work together to improve both wages and profits by seeking high efficiency and better productivity.

Fair Deal in Interior

REPLACEMENT of the New Deal professional bureaucrats in the top positions of the Interior Department with a group of realistic and fair-minded Westerners augurs well for reclamation and electric power in the Far West. Secretary Douglas McKay himself has an intimate knowledge of the clashes between the Western states and its people and industries and the former advocates of centralized federal control and direction of the resources and destinies of this region. And he is picking a strong team to administer the various divisions of his department.

As this is written these Westerners have accepted key positions on the McKay team: Ralph Tudor, California consulting engineer and former officer in the Army Corps of Engineers, is Under Secretary. The two assistant secretaries are Fred G. Aandahl, former governor of North Dakota, who will be in charge of water and power, and Orme Lewis, Phoenix lawyer and former director of Arizona Public Service Company, whose responsibilities are Land and Indian Affairs. As this is written the posts of Reclamation Commissioner and Bonneville Power Administrator have not been filled, but outstanding Westerners have been prominently mentioned as candidates.

Within a reasonable period here are some of the things Westerners may expect to see develop: Closer attention to local sentiment and broader participation by state and local interests in Interior projects involving water development. Resolution of the 160-acre limitation controversy. Development of a realistic, fair and reasonable policy on federal electric power. Clarification and perhaps modification of the present preference and priority clauses relating to the sale of federal power. Cooperation instead of controversy in the relations between Interior and the private power companies. Economy and efficiency in the conduct of Interior Department affairs.

Any developments on some of these things will represent great progress in comparison to the paternalistic treatment the West received from the last administration.

DEAL honestly, fairly and lawfully with all concerned. Make your business and personal conduct above reproach . . . Your business will be most profitable if you charge the lowest possible rates and develop the largest volume of service . . . Try to set a high standard. Keep the cards on the table. We want no secret deals, no favoritism, no corruption. Sooner or later the people will understand. This course may cause you harder work for a time, but eventually it will make it easier . . . Never forget that your Company is a public servant that wants no dollar that it does not fairly earn . . . Take the people into your confidence. Give them the facts . . . Treat your customers as human beings, realizing that mutual good faith and tolerance form the basis of successful commerce between man and man . . . Participate in the public and semi-public welfare activities of your city . . . Maintain the old-fashioned virtues. They will always win in the long run. We are back of you to the last dollar as long as you do your honest best, but we will not forgive any act that is not clean and honorable.—Copco Code of Business Ethics established by A. S. Cummins, president, California Oregon Power Co.

SERVEL, with a ballet troupe, tall show girls, a quintette, top comedian and sensational new products toured the nation with the biggest extravaganza, topping year's effort to put the . . .

Appliances In Show Business

In showmanship as well as in appliances there is competition this year and the competition is on a big scale. Major appliance makers are out for dealer enthusiasm to help them sell the huge volume they are all equipped to turn out, now that materials are available and limitations off. It has started out as a battle of the shows. Later it will be a battle for the markets.

Big Broadway musical shows, with gals, comedians, spectacular settings and the product woven into this glamour, were toured by Westinghouse and by Servel. The latter, just expanding from a gas refrigerator into electrics, and becoming more electric still with a portable Wonderbar and room air conditioners, had the biggest cast and spectacle so far.

Servel

1953 Show of Stars, said to cost a million dollars, went on the road in two companies of some 35 people each to introduce and dramatize the new Servel Ice-Maker, the Wonderbar, the room air conditioner, the full line of refrigerators and freezers. The troupe that played the West was in Denver Feb. 6; Los Angeles Feb. 9; San Francisco Feb. 11; Seattle Feb. 15. Distributors, such as W. J. Lancaster Co. in San Francisco, acted as hosts to dealers and salesmen from the areas and the show was put on in a theater in each city to audiences of up to 1,200. A product-showing and dealer-franchising session usually followed the four-hour show.

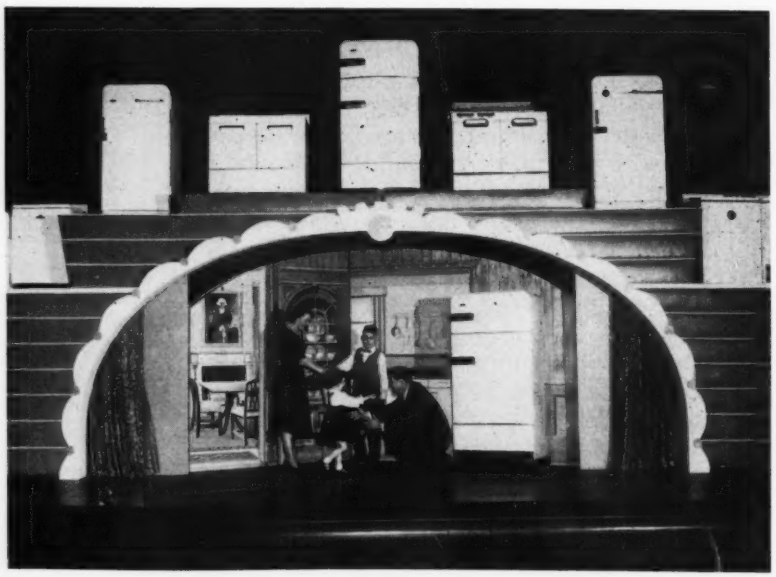
Factory executives giving the product story accompanying the show included Neal E. Schuman, Kenneth Rapieff and Richard Bishop. Stage and TV comedian Sid Stone was a featured star, surrounded by a ballet company, tall show girls, a singing quintette and a cast of actors.

Westinghouse

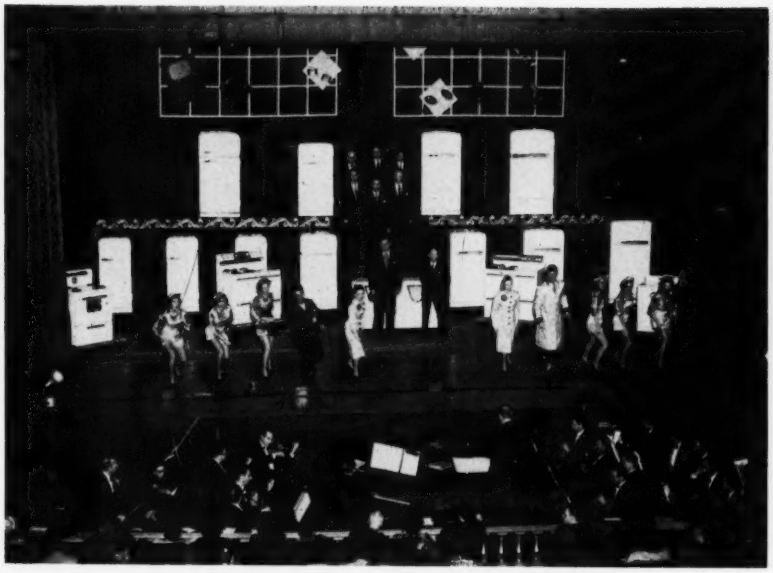
It's All for You, Westinghouse told audiences of dealers and salesmen in large theaters throughout the country with what it declares to have been a million - and - half - dollar show—with four slightly smaller stage companies on the road simultaneously. The Western troupe played Denver Jan. 18; Salt Lake City Jan. 21; Los Angeles Jan. 25; San Francisco Jan. 27; Seattle Jan. 30; Portland Feb. 3; and Spokane Feb. 5.

Accompanying the Western troupe were factory executives Richard J. Sargent, manager, major appliance sales; Robert R. Lynch, sales manager, range department; Maurice H. Vereeke, director of sales training, laundry equipment; Stanley J. Stephenson, sales manager, refrigeration department, and J. Gilbert Baird, manager of sales promotion.

Worked into a script of entertaining songs, dances and comedy was the presentation of the 1953 line of eight new refrigerators, three upright freezers, four new dishwashers, six electric ranges, including one model with the electronically controlled surface unit on which food can't burn. Also stressed was a nation-wide promotion, West-



FRIGIDAIRE's show was for its distributors this year back in Dayton. Businesslike revolving stage is used to dramatize market potentials in households and offices for the 70 models of appliances



WESTINGHOUSE toured to give its dealers a 3-hour package of songs and skits by 12 professionals to introduce its 1953 new appliances, featuring range surface unit that can't burn food

inghouse Week, from March 2 through 6, with TV shows and nine pages of advertising in the *Post*.

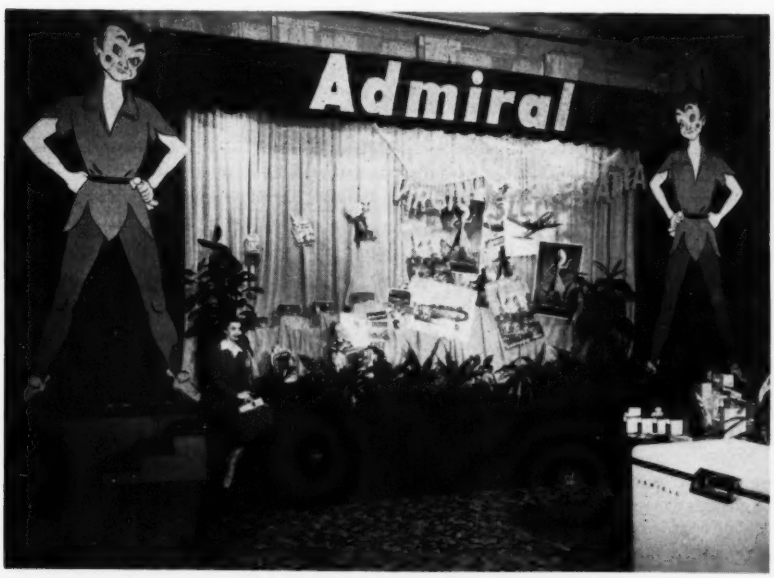
Norge

The show was given to Norge dealers as a dessert course after they had been dished out the meat courses on the features and profit opportunities with the line by factory and local distributor personnel when that company staged its meetings in December. First they were shown ranges—both gas (all with electric ignition though) and electric—washers, conventional and automatic; nine new models of refrigerators and a 20-cu-ft upright freezer that looks like two matched refrigerators side by side. Change in design now utilizes the outside case of the freezer as the condenser surface, keeping it warm enough so that no condensation gathers on it in humid atmospheres.

Jack M. Tenney, formerly Western regional manager, now national refrigeration sales manager, brought applause when he announced stronger margins for dealers at no price increases, in order to make selling worth while. "Don't trade profit and legitimate markup for trips to Paris," he jibed at other manufacturers' incentive schemes. Other factory executives who spoke were R. C. Connell, national general sales manager of Norge, and R. H. Pizor, Western regional manager.

BENDIX let its distributors, like Leo J. Meyberg Co., stage showings of its expanded appliance line. Frances Alexander, home service director, Herb Atwater, Meyberg Co., E. C. Brodie of Bendix at San Francisco showing

At the Sues, Young & Brown meeting in Los Angeles, attended by about a thousand, at the Ambassador Hotel, M. G. Sues, E. E. Young, C. P. Culbert, Don Piper and Cy Hughes participated in the showing. In San Francisco Thompson-Holmes men carried parts of the presentation and R. E. Coleman, ad manager, distributed special front-page editions of both the San Francisco *Chronicle* and the *Examiner* to all attending.



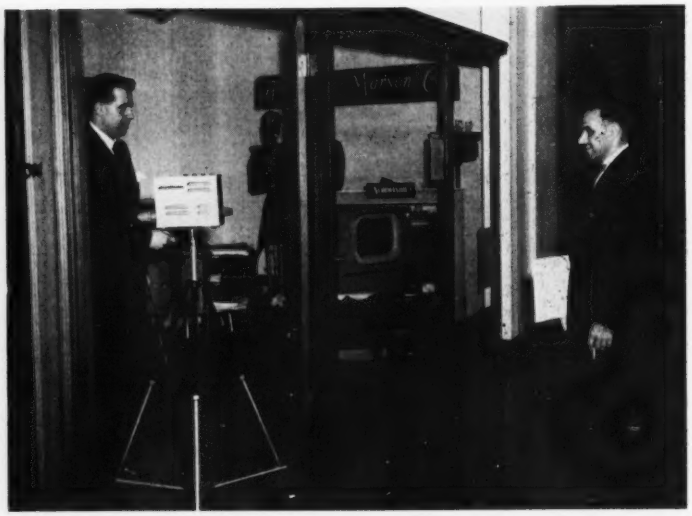
ADMIRAL tied in to the Disney "Peter Pan" promotion by providing dealers with miniature stages and magnet-moved characters for children to bring parents in dealer stores for demonstrations

Bendix

Other new product shows followed more the pattern used by Leo J. Meyberg Co. in presenting the new Bendix Duomatic and its new kitchen appliance line. In San Francisco the Meyberg Co. took two large ballrooms at the St. Francis and ranged the lines being featured in attractive displays. Dealers were then brought in on invitation and given personal presentations of the attributes of each.

E. C. "Steve" Brodie, Bendix division manager for California and Arizona, and Frances Alexander, regional home service director for Bendix Home Appliance, were assisted by Herb Atwater, major appliance sales manager of the Meyberg Co., and Marcia Mead, home service director for the distributor.

APPLIANCE DINNER SPEAKERS were Robert Gros, PG and E advertising director, Elmer "Sizzle" Wheeler, sales counselor; Walter Baker presided



TV CAMERA, small, compact, for industrial uses, and simple monitor remote observing unit by Kaye-Halbert, shown by Art Maryon Jr.

CHINTZY decor with fabrics for International Harvester refrigerators shown by Ann Cook, I-H home economist, to Esther Day, PG and E, and Thelma Fahrenkreg, Coast Counties Gas & Electric, home economists

SEWING, either on a table or by hand as with a small power hand drill, is possible with 4-lb Bell portable machine, being shown here by Paul Rice to Mrs. Twing, Mr. and Mrs. Appleby of Appleby's, Palo Alto

Market Reflects New Optimism

Heavier buying but without fever, bigger attendance, many model changes and a few entirely new devices made for a new lease of optimism at the Western Winter Market at San Francisco Merchandise Mart, Feb. 2-6. In appliances much was made of new details of color, decoration and operation. TV sets shown were of 21 in. and larger. A swing to upright freezers was evident. More makes of dryers appeared but not much emphasis was made on room air conditioners.

Something different was offered the 500 or more attending the radio-television and appliance trade dinner, Wednesday night, Feb. 4, over which Walter T. Baker, Pacific Coast district manager, Westinghouse Electric Appliance Division, presided. Peripatetic Robert Gros, ad and publicity manager, Pacific Gas and Electric Co., recently back from a 35,000-mile air tour of the Pacific with an admiral—not the trade name—spiced a serious talk on the importance of the Far East situation for America with bits of humorous reminiscence. Elmer Wheeler, dynamic "fat boy" sales speaker, entertainingly set forth his five tabloid sales sizzlers: (1) Sell the sizzle, not the steak; (2) don't write —telegraph; (3) say it with flowers; (4) don't ask if—ask which; (5) watch your bark. Appliances and TV selling were only inferred.

ELECTRICAL WEST

Sales Guide

News Letter

March 1953 ©

FOR THE ELECTRICAL MERCHANT OF THE WEST

The pattern

While February appliance business was fair it began to be felt why so many have predicted that this will be a year for strong selling effort. Certainly weather has been no deterrent to sales in the West this year. It is just going to be more work, take more skill to sell.

Tumult and shouting

Manufacturers are beating the drums with more millions in advertising and promotion than in all history. It is like an Australian rabbit run, they hope to herd customers into dealer stores by noise and fanfare. But the public grows hardened to the roar. It needs some gentle selling persuasion in person by salesman who take interest in them.

Real preparation

To groom the sales force for the job plenty has been going on. Northern California Electrical Bureau has just put 3,000 through a series of five Jack Lacy sales clinics. . Inland Empire Electric League in Spokane is promoting big-ticket Planned Kitchens, using the Washington Water Power Co. kitchen planning service and a tie-in with lending banks for open-end mortgages. . Arizona Merchandisers Assn. is readying for a spring Appliance Show, April 9-12, and so is San Diego Bureau of Home Appliances, April 21-26. . Edison Electric Institute and National Electrical Mfg. Assn. have planning kits for electric range promotions in April and May, and NEMA and NAEDistributors have promotions ready for housewares for Mother's and Father's Days and June Brides.

Vitamins for sales

San Diego's dynamic Bureau of Home Appliances gave the area's sales force a shot in the arm with its high-speed annual winter conference, Feb. 18. Victor C. Eggerding, National Assn. of Credit Men president, swept aside thoughts of any depression. George Foerstner, Amana executive vp, gave new courage to hit the freezer market with news the flyboys were cleaning out of it. H. L. "Red" Clary dizzied the mind with some of the fantastic things to come that make the appliance business only beginning to ride. Willie Mae Rogers reminded salesmen that their most loyal friends were women who were satisfied. H. G. Dillin, San Diego G&E vp, assured plenty of power and utility support. Taylor Brown and F. M. Raymond dramatized the volume of ad money to be spent locally by converting thousands to marbles. Dan Turner offered dealers a simplified method to interview and select salesmen. The "Yes-But" salesmen's contest winners were rewarded and their winning answers distributed. But see the story in detail next issue. Also the salesmen's interview form and how to use it. Oh yes, the new Mexican TV station XETV, Channel 6, promised high-class programs, not bull fights.

Western Merchandise Mart has been sold to Ben Swig, owner of the Fairmont Hotel and other properties. Frank Runyan stays on as general manager and Cameron Ball as assistant gm. Leonard Read Jr. has resigned and so has George L'Amoreaux. Henry Adams was named promotion manager, taking over both space and promotion assignments. . Dates for the Summer Market have been set for July 20-24.

S. F. Mart is sold

Fair Trade is really having a battle. There are suits in the courts in several states. Westinghouse has filed some new ones in California against Feldman Sales and the Grayson-Robinson stores. Sunbeam is asking the Supreme Court to dismiss the case against it charging its franchise contract is illegal; Sunbeam maintains that the McGuire Act further upholds its position. However, with giants fighting giants the whole thing may be back in the Supreme Court soon.

Slug it out

Kelvinator, which recently bought ABC Washing Machine, has begun to deliver and show its new laundry equipment line. It has a new automatic with a glass lid, 2 wringer washers with pumps, and an ironer. Kelvinator is also featuring a new line of kitchen cabinets, "pantryettes," and has a renovating program for trade-in refrigerators for dealers.

Fills out its line

Thor has entered the acquisition race and has bought the patents and equipment and name of Prestline ranges and will soon enter the range field. It has not yet returned to making the dishwasher insert for its automatic clothes washer but is back making Gladirons. A water-and-soap-saver feature is being promoted with its automatic.

A new sponsor

With a new shorter $99.95 disposer, Youngstown Kitchens has also added some nonelectric features but good sales tools--such as a color-in-the-kitchen program of papers, decals, etc. Also novel is use of a Drive-It powder power tool made in Portland to install cabinets against concrete walls. For sewerless country areas it has a chemical Enzymatic to speed digestion of disposal wastes in septic tanks. Youngstown has added Columbia Electric & Mfg. as Spokane distributor.

Kitchen kinks

Bruce Lee now heads the Contra Costa Appliance Assn., succeeding Chet Brunelle of Concord. Lee has a store in Walnut Creek. Goodman Bader, Empire Furniture, is vice-president and Ray Garrett, Coast Counties Gas & Electric, secretary-treasurer. Andy Masser, Thompson Electric, represents the group on Northern California Electric Bureau.

New line-up

Norge will hold two of six regional sales meetings for distributors in the West late this month. One will be at the del Coronado, San Diego Bay, March 26-27; the other the Olympic, Seattle March 30-31. H. L. "Red" Clary, who spoke recently in San Diego, will be in charge and spring and summer programs unveiled to distributors. Norge's new clothes dryer and upright freezer will be shown. George Smith, Norge president, R. C. Connell, gen. s.m., and others will be West.

General staffing

Edison Electric Institute annual sales conference will be held in Chicago, March 30-April 2. Many utility sales people usually attend. Awards for outstanding sales promotion activity are awarded then for lighting, farm electrification, appliance promotions, home service and laundry equipment promotion.

Utility event

Family Life at Its Best in the West is the theme of the 4th convention and exhibition of the California Home Economics Assn., at Palace Hotel, March 28-30. Some sixty exhibits of appliances and home products will be seen at the exhibition in connection with the three-day conference program.

Important gals

Fever abates

Television was settling down to normal most everywhere in the West, except for flurries where new stations are about to begin telecasting. The big rush is past. Now as stations come on the air the trade is better prepared, with sets on hand, service set up, installation of antennas better understood. Manufacturers too are settling down to one line a year instead of a new one every month or two, obsoleting dealer stocks. Admiral, Arvin, Crosley, DuMont, G-E, Motorola, Stromberg-Carlson have each announced a single-line-a-year policy.

Color and laws

Color talk goes on and there are predictions that FCC may reopen the subject later this year to hear the case the joint industry committee puts up for an all-electronic compatible system. Harry Kaye, Kaye-Halbert president, says that TV's answer to 3-dimension movies will be 3-dimension TV. . California's Legislature had a bill introduced to require licensing of all TV servicemen. Similar licensing at the local ordinance level has been fought and turned down in almost all cases. . ABC-Paramount Theaters merger finally went through.

Prices stand

When price control went off of radio, radio service, and then appliances in total, very few prices were raised. Emerson increased list on four 21-in. sets. . Paul Galvin of Motorola warned the trade that the market can bear no increases; that such would impair the ambitious production programs of most manufacturers.

Music addicts

That just plain old sound is still popular was certainly proved by the interest and 17,000 attendance at the 3-day Audio Fair at Los Angeles Feb. 5--7. Some 15 distributors exhibited products of several hundred manufacturers of sound equipment and components. Lectures were well attended and demonstrations of 3-dimensional sound were featured.

TV changes

Distribution line-ups in the radio-TV field include: Horn & Cox Inc. of Los Angeles is now distributor for Pacific Mercury TV, ending the factory distribution plan it had started. Manny Silver heads the H&C TV division. . General Products Co. of Honolulu is Hallicrafters' TV distributor there in the islands. . Emerson has set up Emerson Central Valley Distributing Co. in Fresno, 2410 Railroad Ave., with Maury Ponsart, sales manager; Ken Sundwall, operations manager. Also announced by Emerson is that Terrance Hayward is sales and merchandising manager under William H. Cormier, Western sales manager, in southern and central California and Nevada. . John R. Wing Co., distributor of Packard-Bell in Sacramento, has moved to larger quarters. . Clyde Allen Co., Merchandise Mart, San Francisco, has set up a separate electronics department under A. C. Brunner to handle the Conrac line, Philmore Co. electronic components, Stability Radio Components of London and a phonograph line. Lee Naylor will manager the electronics division in Seattle, Charles Conway in Phoenix and Jonas Templeton Jr. for the San Joaquin Valley. . Ampex Electric Corp. of Redwood City, which is developing tape recording of TV, has opened a district sales office at 100 Bush, San Francisco, with Jack Hauser in charge. . Bendix Radio & TV has appointed Afton Lemp Electric Co. as its distributor in Boise. . Columbia-CBS has named Gilbert Bros. as Portland distributor for its line.

Glass heat

Clyde Allen Co. also is agent for the Alkar Co. line of radiant glass electric heaters, made of Corning glass with aluminum resistance cast into the tempered glass itself. Comes in maple, blonde and mahogany wooden frame, is portable, sells for $37.95, for 1,000-w heater. Allen also has taken on the Crown line of stoves, which includes an electric range, a 30-in. model with a king-size oven, fluorescent lamp, electric clock and timer, convenience outlet.

Distributor intelligence

Ground has been broken for construction of General Electric Appliance Co.'s new headquarters building in Vernon, according to S. B. Maher, manager of this G-E distributorship for southern California. . R. D. Schwalb Co., distributors, has established an office, display room and warehouse in Fresno with Harold H. Levora in charge. . Amana-San Joaquin Distributors at 1833 Van Ness, Fresno, was recently established for that line of food freezers in eight central California counties. Joe Marsalisi Jr. and Jim O'Gorman, two top Amana salesmen in Los Angeles, are owners of the new firm. . Kassler & Co., 7636 Santa Monica Blvd., Los Angeles, has been appointed the southern California distributor for the Universal Major Electric Appliance Co., with the exception of San Diego county. . Horn & Cox Inc. is now distributor for Pak-A-Way home freezers. . California Distributing Co. of Oakland was recently awarded the Revco Chill Chest annual award for sales for the second straight year at a recent convention of distributors of the line in Chicago. . A. O. Smith Corp. has opened in Oakland a new service branch for replacement parts, service and repair of its motors and water heaters, with George A. Carlson in charge. . F. B. Connelly Co. is remodeling its three houses in Seattle, Portland and Spokane with the latest in fixtures and model kitchens, auditoriums, TV salons and offices. . Osborne & Dermody Inc., Philco distributor in Reno, held its annual midwinter dealer show to present the line; used a Dage TV camera, which it also distributes, to show how dealers could use it for store TV.

Among people

Among people these made news: Laurence J. Melnick has been made sales manager for the Pfaff industrial sewing machines in the Western half of the U. S. . G. H. Harker, Los Angeles manager of G-E small appliance division, added Norman A. Langenfeld as district representative. . F. T. McDonald was appointed L. A. district sales manager for American Kitchens, C. Fred Hastings announced. . Raymond E. Fraley has been appointed sales representative for Landers, Frary & Clark's housewares and vacuum cleaner division in the Seattle area. . Remington Corp.'s air conditioning division has appointed R. H. Case to represent it in Seattle for Northwest states and R. E. Tweedy, in Phoenix, for Arizona and southern California.

Time talk

Telechron executives A. F. Fisher, R. T. Woodward, M. J. Dunn and E. C. Pease saved themselves a trip West by holding a nation-wide telephone conference with field men in Denver, Salt Lake City, Los Angeles, San Francisco and Seattle to announce a new electric alarm to sell for $3.98, or $4.98 with luminous dial. (G-E has the same.)

Can see out

while refrigerated room coolers are the rage now, Thermador of Los Angeles still does all right with evaporative coolers and now has a new Clear-Vue model that sits low outside the window so as not to obscure the view.

New devices

Some new appliances recently announced are: A completely new de luxe power-action Toastmaster toaster with a motor that lifts the toast gently when done. . Two new steam and dry irons, a rotisserie, an infrared broiler and deep fat fryer have been added to the Rival Mfg. Co. line. . Another clothes dryer called Sun-Aire, made by Stiglitz Corp. at $219.95, is claimed to be the lowest price on the market. . Carrier Corp. has a new complete home air conditioning packaged unit, only 37x37x62 in. that heats or cools, designed for small mass-market homes. . Westinghouse introduced a new open handle steam-or-dry iron for Western distribution at the Winter Market in San Francisco. . Both Sunbeam and Universal have small portable mixers now at $19.95. . G-E will soon have a new toaster.

Cluff Littlefield

Reed McAllister

Stone Rawlings Brady

Leagues Launch Year's Activities

Intermountain

Associations, like the Intermountain Electrical Assn. in Utah and eastern Idaho, carry on a variety of activities to interest and benefit the many diverse branches of the industry. This was demonstrated and reviewed at the annual conference of IEA in late January at Ogden, presided over by James C. Littlefield, Utah Power & Light Co. Salt Lake division manager, its president. Everything from the legal limits of an association, through its wiring and lighting, its appliance promotions, sales training and finally the opportunities ahead in freezer, room cooler and television were covered in the concentrated one-day session. Combined with it was the installation of new officers.

That 1952 marked the beginning of a new postworld War II era in which there is more stability in business, but with rewards only for those willing to work hard on basic fundamentals, was Littlefield's observation as he proceeded to review the range of activities of this association during his administration. Special mention was made of the electric range campaign, the TV committee activity during extension of TV to more of the area and the housewares campaign before Christmas. Littlefield reminded all how interdependent they were, how the sale of a range, for example, brought business to manufacturer, wholesaler, contractor, wireman, equipment maker for the utility and the utility itself. Membership growth of 17% was noted and fine chapter meetings commended.

Austin Shewell

Tribute was paid to Ray Halverson, association manager, then ill with polio, and to Harry Shewell, who as acting manager had arranged the conference.

As competition increases, George Nelson, attorney, said, abuses increase. An association can use the law to proceed against untruthful advertising or to require Fair Trade laws upheld.

Ray Halverson, managing director of Intermountain Electrical League, stricken with polio Dec. 7, was confined to an iron lung from that time, but despite reports of expected recovery, died Feb. 22.

But he warned against any agreements that can be held to be in trade restraint. As an individual a dealer can stop buying but a group cannot, nor can a black or white list be made. An association can conduct an educational campaign on the advantages of ethical business conduct only.

With forecasts and analyses of business and building construction for the year ahead from McGraw-Hill department of economics and from *Business Week*, and with data on electrical construction from his own magazine, August Eckel, Western editor, *Electrical Construction and Maintenance*, Chicago, foresaw a good year. He particularly stressed the opportunities in the *optional* market, the market for new wiring and electrification that can be sold above the *assured* market.

To keep the freezer industry from defrosting, Marvell Mills suggested an educational program on preparation of foods for freezing and that dealers promote and sell harder during the slow months.

Repeating in essence the inspirational talk on selling, Dr. O. Preston Robinson, now general manager of *Deseret News & Telegram*, reviewed the motivations in human beings and how to secure conviction through effective use of proof, evidence and claims.

Air conditioning's future was well depicted by Gerald Wilcox of Walter B. Lloyd Co. That room conditioning, no longer a luxury, now tops a billion dollars a year, he said, showed its potential business. Past obstacles of

lack of dealer and distributor interest, extravagant installation and service charges, lack of water, etc., are now overcome by new packaged units in four prime sizes, with definite capacity ratings making estimating and installation easy and satisfactory. Like radio, homes can use more than one unit; in fact every TV user is a prospect to make summer viewing comfortable.

The "good new days" were humorously contrasted to the "good old days" by Charles L. Wheeler, president, Salt Lake Hardware Co. Retailers, he said, were doing a miserable job of human relations; had no interest in their customers. Ken Brady, president of the Salt Lake Retail Chapter, also talked in humorous vein, ending with two pictures to contrast salesmen who substitute salesmanship with cut prices. George Herrod, representing Ogden dealers, said that firm orders are now being placed and a seller's market can be created by promotion. He cited the example of a recent deep fat fryer promotion. He cautioned truth in advertising, truth in service promises, keeping of records, careful buying to prevent later forced selling at cut prices and loss of profit.

Modern lighting techniques were described and demonstrated by G. B. Buck II, district engineer, General Electric Lamp Department, Denver. He attributed the tremendous growth in lighting in the 75 years since the first incandescent lamp was invented to industry cooperation and to interdependence. He predicted that lighting levels in the next 10 years will go to hundreds of foot-candles; that lighting will be designed with human psychological requirements in mind. A trend toward 480/277 v, three phase for lighting is growing, as well as an expansion in germicidal lamp installations.

A new film, *Octopus in the House*, just released by National Electrical Products Corp. was presented by John Longden, district representative, after a preliminary talk on adequate wiring.

Television—Yesterday, Today and Tomorrow was recalled and prognosticated by M. D. Schuster, general sales manager, Hoffman Radio Corp., Los Angeles, as the banquet speaker. Schuster left his audience with a glimpse over the horizon with the many almost fantastic developments that will come in electronics to bring entertainment to the home and to serve industry in many ways.

Mark Austin, Sunbeam Corp. representative in Salt Lake City, was installed as the new president of the IEA, succeeding Littlefield. Kenneth Brady, Brady-Milne Co., Midvale, was made vice-president and Carlos Stone, former manager, now manager, Mountain States Distributors Inc., was made secretary-treasurer. The board of directors numbers representatives from every branch of the industry and every chapter of the association, 21 in all.

Top-Level Committee in Los Angeles

"We are rapidly going places," declared Ed Young, president of the Los Angeles Electric League in his closing address, as he announced the membership had almost tripled in the last year. The occasion was the annual dinner at Rodger Young Auditorium, Jan. 22, attended by about 250. Young of Sues, Young & Brown Inc. told

Young Cox

how the league had considered staging its own electrical show in 1953 but decided to go along with the Home Show to gain the advantage of this show's broad coverage.

Ray B. Cox, president of Horn & Cox Inc., was inaugurated as the new president with Leo Allen, Barker-Allen Electric, executive vice-president; Robert Williams, Brand Appliances, secretary; and Al Ayeroff, Ayeroff Bros., treasurer.

Cox announced the formation of a new policy-forming and planning top-level management committee, to meet between monthly general meeting dates of the board of 39 representatives of the many factors in the business.

In an adequate wiring committee report, Leo Allen, chairman, said that 3,469 house building jobs had been contacted, 90 had been certified, but 16% more range circuits were added, 5% more water heater circuits, 7% more dryer circuits, 3% more freezer circuits, 10% more dishwasher circuits, 15% more clothes washer and 64% more disposal unit circuits and 73% more bathroom heaters. "This means that 4,189 more appliances can be added to the circuits in these homes without requiring more money for special wiring," he said.

A better lighting publicity campaign is being prepared by the lighting division of the league, according to Nat Blumberg, Lightolier, chairman of the division. About 10,000 brochures have been printed by the division for distribution by the utility to interest home owners in new fixtures. A course in merchandising of lighting and a lighting show are contemplated in conjunction with the contractors and fixture manufacturers.

A dryer campaign, then under way by the residential sales department of the Los Angeles Department of Water & Power, was reviewed by Floyd Lovelace, manager of the department. Electric range promotion was discontinued three years ago, he said, but this new appliance and the freezer later will be promoted in advertising.

Licensing of TV and radio repairmen, which would have cost the industry $100,000 a year, was turned down by the city council because of the battle put up by the league, Robert Davis, general manager, Hoffman Sales Corp., said. By working for a reduction of the county license fee from $50 to $24, Davis estimated another $150,000 was saved for servicemen.

Featured speaker of the evening was Jack Lacy, sales training consultant. He predicted that 1953 would be a year when the "men are separated from the boys" in salesmanship. Proper organization by the salesman of his presentation to a prospect is vital, Lacy told them. The best means to gain confidence in one's own ability is to go out and actually sell.

Subsequent to this dinner meeting, at which only the highlights of the year's activities and the program for 1953 could be briefed, Glen L. Logan, managing director, issued a bulletin in which each of the many facets of activity were outlined in some detail and showing a substantial growth by the league in all phases.

Among Other Leagues

Sacramento Valley

An electric range wiring bonus plan, first approved by a meeting of the Sacramento Valley Electric League in December, received so much criticism from the contractor members of the league that it was set aside until such a plan is urgently felt necessary.

The plan, submitted by George Cane, director of Sacramento Municipal Utility District's electrical development division, as well as secretary of the league, called for a sharing of the wiring bonus by the SMUD, dealer, distributor and contractor on each range sale. The maximum was to have been $50, any amount above that the customer would pay for. Forms and rules for the program were all worked out and ready to launcn in early spring. SMUD officials say that they are ready to go into such a program whenever the industry feels it desirable.

Its appliance service policy was also revised by SMUD and announced to dealers. Under old rates SMUD would provide one hour of time free on a service call to range, water heater or space heater customers, with $2 per additonal hour, a $1 minimum. The new schedule gives a half hour free. Additional time is charged at $4, with a $2 minimum. List price is charged for parts.

Phoenix AMA

Now preparing for its Appliance Show, April 9-12, the Appliance Merchandisers Assn. of Phoenix, is well along on its program for the year, announced at its annual meeting in January when Jim Donohue, Climate Control Co., was made president. Other officers elected then were: Glenn Jones, Arizona Hardware Co., vice-president; Don Morgan, Al Jennings Co., secretary; Leon Black, Black & Ryan, treasurer. E. W. Cowdry is manager and directors number 15, representing wholesaler, manufacturer's representative and dealer and utility members.

The January promotion was on adequate wiring, which will be hit again in August. Modern kitchens also had a promotion in January. In February the first major activity, a sales training course, started. Automatic laundries were also promoted. March started the evaporative and refrigerated air conditioning which will also get a push in June. The Appliance Show is in April, with refrigerator and freezer promotions. May 3-9 will have a housewares drive; May 10 to June 6 an electric range; June 28 to Aug. 1 another on refrigerators and freezers. Television will start getting extra promotion in August and the annual TV Exposition dates are Sept. 25-27. From then on heating will be featured and from Nov. 29 to Christmas, housewares and traffic appliances.

Each promotional event is in charge of a pair of co-chairmen. The overall slogan for the year is, "Selling's the Key in '53." The sales program booklet is in the form of a monthly calendar on which the events are marked and accompanying information is displayed.

NCEB and Lacy

Three thousand new sales trainees of Jack Lacy are at large in the area covered by the Northern California Electrical Bureau, according to LeRoy H. Bennett, manager, as the five series of sales clinics closed. The ambitious program started with a series of four Lacy classes in San Jose, Feb. 2, 9, 16, 23; then Fresno, Feb. 3, 4, 5, 6; Sacramento, Feb. 10, 11, 12, 13; Oakland, Feb. 17, 18, 19, 20; and San Francisco, Feb. 24-27. The course was run on four instead of the customary five lessons, by adding a half hour to each. Cost to those taking the course was $15, which included the book, *Advanced Salesmanship.*

San Diego Bureau

To do justice to the annual winter conference of the Bureau of Home Appliances of San Diego County, held at Hospitality House in Balboa Park as a luncheon and a dinner session, Feb. 18, the report on it will be held over until the next issue. Some highlights, however, will be found in this issue's Sales Guide News Letter.

Exhibit space for the Spring Fair of Modern Home Ideas, April 21-26, is going fast as preparations are being made by the fair committee and Secretary-Manager J. Clark Chamberlain, and for the contractors building exhibits by Carleton Bunce for this big event.

Meanwhile a laundry equipment promotion is starting March 16 running into April. The electric housewares committee is developing plans for a Mother's Day and Father's Day and June Bride series of promotions.

IEEL—Spokane

Maage La Counte, vice-president of Columbia Electric & Mfg. Co. and in charge of its distributing organization, was elected president by the board of directors of the Inland Empire Electrical League recently. Lloyd Distad, Lloyd's Sales & Service, was chosen vice-president; V. E. McCain, Graybar Electric, re-elected treasurer; Frank Tool, Washington Water Power Co., re-elected secretary and Robert L. Wilkinson, managing director, Dan Peterson, assistant secretary. Heads of the functional sections are: E. W. Hatch, Washington Water Power Co., appliance section; R. M. Spiger, Sunset Electric Co., radio-TV section; Dave Mozes, General Electric Supply Co., supply and apparatus section.

The appliance section was asked to study the possible encouragement of open-end mortgaging on appliance purchases by the board of directors. It was also working on a program of promotions for the year.

Yuba-Sutter

A cooking school and show, to be held in May, are being planned by a committee of the Yuba-Sutter Gas & Electric Appliance Assn. with George Bosko, Marysville Furniture Co., chairman of a special committee on which also are Clarence Smith, Sears; John Morris; A. L. Galler and O. M. Cook. Tentative plans include a two-day cooking school in the State theater, Marysville, and a two-night home show in Memorial Auditorium, where last year's combination cooking school and home show drew 6,500 persons to five sessions.

At the recent election of officers Henry Swanson, Olympic Radio Shop, Marysville, was named president; P. L. Marcyes, Central Valley Refrigeration Co., Marysville, vice-president; Dan Alexander, PG and E, secretary-treasurer. Directors include L. F. Putnam Jr., O. M. Cook, Ed Forbes, Ernest Townsend, A. L. Baller and John Morris, who is the Northern California Electrical Bureau director for the association.

DOWNTOWN AREA of Beaumont, Texas, now enjoys the better continuity and uniformly good voltage of a secondary network. Workmen above are installing new 500-kva G-E network unit on Tevis Street between Pine and Travis Streets.

Beaumont installs a network to handle heavy load growth

Installation of this G-E network unit illustrates only step that will be needed in future to add new distribution capacity

As today's rapidly expanding urban loads make it difficult to perpetuate radial systems, more and more electric utilities install secondary networks.

They find that, once installed, a network gives them complete flexibility for solving load growth problems —on an orderly step-by-step basis—without any rearrangement of secondaries or service entrances.

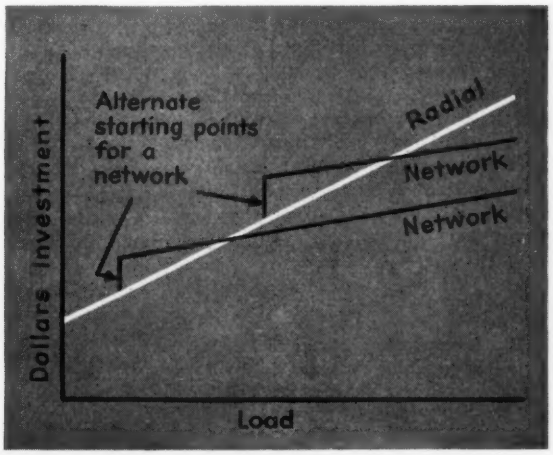
In Beaumont, Texas, for example, the Gulf States Utilities Co. found that it required extensive engineering calculations, juggling of existing loads and bolstering of circuits to meet increased loads in the downtown area. As a result it retired its radial system in favor of a network.

NO MORE LOAD GROWTH "HEADACHES". Now, when rising loads require additional capacity, all that will be necessary will be additional network units. With a network, service connections and low-voltage connections are provided initially thus eliminating any need for rearrangement or re-enforcement when a new transformer is added.

HELP FOR YOUR SYSTEM. If you, too, are struggling to accommodate new loads by perpetuating a radial system and your load density has risen to approximately 10,000 to 15,000 kva per square mile, it may be time for you to investigate the flexibility and economy of a secondary network.

For help in solving your network problems, and for complete information on the many advantages of G-E standardized network units, get in touch with your local G-E Apparatus sales office. Or write to Section 402-129 for Bulletin GEA-5024. General Electric Company, Schenectady 5, N. Y.

VAULT SIZE MINIMIZED when you install G-E standardized network equipment since both high- and low-voltage cable terminals are well below the top of the transformer. Vault depth need be only 7 feet to roof slab to provide sufficient room for maintenance and inspection.



IT PAYS TO START A NETWORK. Although the change from a radial system to a network system means some initial expense, future increases in capacity require less investment with a network. And with a growing load, the sooner the network is started, the lower the ultimate cost.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

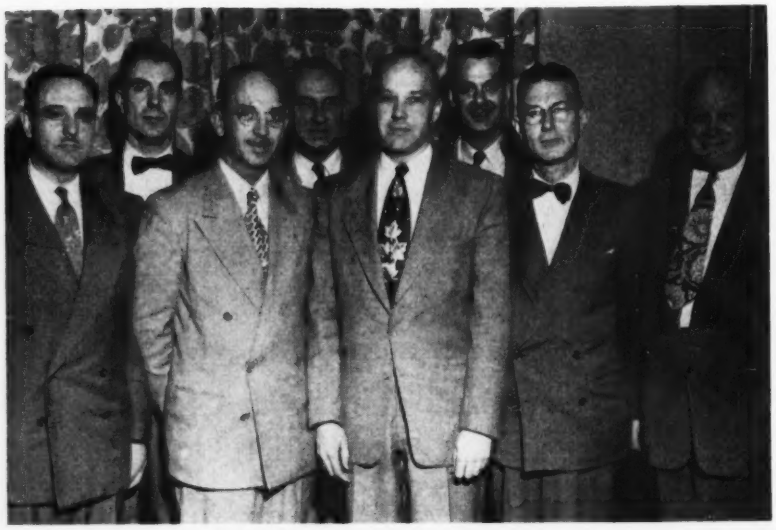
NWEL&P Sections Plan Salt Lake Meet

The Accounting and the Personnel Sections of the Northwest Electric Light & Power Assn. have arranged to hold a joint meeting at Salt Lake City on May 20-22. Headquarters will be at the Newhouse Hotel. Combining of the two sections into one meeting is under trial this year, since ordinarily both have held their own conferences at different times.

Under this year's arrangement, the first morning will be devoted to a general session for both groups, with top industry speakers on the theme of public relations, and a panel discussion of training employees and supervisors, and relationships between accounting and personnel departments. After the opening general session, the two sections will separate into their own conferences to run for the remaining two and one-half days.

Tom Woodside, Utah Power & Light Co., chairman of the Accounting Section, is coordinating the program for his conference, while C. Herald Campbell, Pacific Power & Light Co., chairman of the Personnel Section, is handling the personnel program. Accident prevention and safety, under C. B. Greenough, Mountain States Power Co., chairman, is taking a part of the program of the Personnel conference.

Local arrangements of hotel reservations, banquet and luncheon programs, trips to points of interest in and around Salt Lake, and similar details are in the hands of Eldo Halliday, Utah Power & Light Co., for the accounting group, and Pat Holton of that company for the personnel group. Holton is vice-chairman of the Personnel Section.



OFFICERS of the Electric Club of Oregon for 1953: Dan Webster, president; Max O. Taylor, executive committeeman; William H. Hayden, first vice-president; Austin M. Case, executive committeeman; James G. Kirwan, second vice-president; L. J. Collins, executive committeeman; George B. Bocarde, treasurer; L. A. Kallen, executive secretary. Headquarters are at Portland

PCEA

By taking the conference to the membership the Business Development Section is turning what formerly was a limited participation in the Pacific Coast Electrical Assn. into a very widespread interest. The first three of the eight regional meetings, in Fresno, Stockton and San Jose, prior to press time, more than proved Vern C. Redman, chairman of the section, right in his program this year. At Fresno the attendance was 175, at Stockton 250, and San Jose 240.

"Last year at Pasadena at the Business Development Section conference," said Redman, "a very fine session on agricultural power was attended by only 30 or so. In Fresno alone at our first conference 100 heard the speakers, and it will be similar in other meetings. So the benefits of the PCEA are really being taken to the members, where they live." Full details of these meetings and a briefing of the talks given will be carried in our next issue.

NAED

Sam Scott, Graybar, Los Angeles, chairman of the Pacific Zone, National Association of Electrical Distributors, has announced the next convention's dates. It will be at Huntington Hotel, Pasadena, June 8-10. Scott declares that the program will have the best guest speakers in the field on topics designed to develop more efficient procedure in conducting a distributing business. The 45th annual national convention will precede it, in Chicago, at the Conrad Hilton, May 24-29.

ESL

Major General W. W. Foster of Victoria, B. C., chairman of the B. C. Power Commission, has been elected to succeed H. N. Walters, general sales manager of the B. C. Electric, as president of the Electrical Service League of British Columbia. Other officers elected at the recent annual meeting include: H. Horsman, vice-president; G. L. Haszard, treasurer; C. W. Nash, secretary; and R. Hall, secretary-manager. In the absence of Hall J. R. Dooley will act as secretary-manager. D. A. Grauer was appointed honorary president. Named as advisory council members were T. H. Crosby, S. Grisdale, W. C. Mainwaring, H. N. Walters, C. E. Woolgar, J. H. Taylor, and the vice-president of the Vancouver Electrical Assn.

NISA

Over $350 in prizes will be awarded in the award contest for 1953, just initiated by NISA for employees of its members. The prizes are given for usuable shop ideas and methods, a program started only two or three years ago and steadily growing each year.

Dealers

Monterey Peninsula Gas & Electric Appliance Dealers Assn.'s officers for 1953 recently elected are: president, Harold Cohon, Lighthouse Home Furnishers, Monterey; vice-president, Les Hicks, Hicks & Howell, Monterey; secretary-treasurer, Ellis Langley, PG and E, Monterey; and William Lauritzen as electric range section chairman and director, Northern California Electrical Bureau.

Santa Cruz-Watsonville Gas & Electric Appliance Assn. elected as 1953 officers Ed Lippert, president, Howard Dysle, vice-president, and E. A. Byer, secretary. Mabry Bibbins was president last year. Last prior meeting of the organization heard a member of Wesix Electric Heater Co. discuss aspects of electric heating.

The DUTCH BRAND Insulating Foursome

1

DUTCH BRAND Friction Tape

DUTCH BRAND Friction Tape is well known for its dependability. It does not fray . . . has the necessary strength for good workmanship . . . the correct adhesion makes firmly held joints . . . removes from the roll easily and it has long life on the job. 2000 volts for single thickness. It is the type tape that is dependable and easy to work with. Be sure to get this top quality by asking for DUTCH BRAND.

2

DUTCH BRAND Plastic Tape

DUTCH BRAND Plastic Tape has proved a favorite because of its excellent performance. By actual test and use it has excelled in the plastic tape field. It is super thin, with ample strength and 150% stretch. It resists weather, oils, acids and corrosive chemicals. It is available in regular .007" thickness or heavy duty .010" thickness for winding heavy cables, heavy electrical harness or for use with power driven tape machines. Dielectric resistance averages 1000 volts per mil of thickness. The best test is to try DUTCH BRAND Plastic Tape...order it from your supplier today.

3

DUTCH BRAND Rubber Insulating Tape

Here is an old dependable of the electrical trade. "Tops" for years in electrical insulating work. It fuses instantly without heat and has the strength and stretch necessary for good joints. It resists up to 18,000 volts through a single thickness. It contains no corrosive chemicals. Its long life makes it dependable and workmen find it easy to work with. It costs no more to have the best . . . just specify DUTCH BRAND on every order.

4

"DB" Wire Connectors

"DB" Wire Connectors are the latest addition to the DUTCH BRAND line. They are made to careful specifications and high standards as has characterized DUTCH BRAND products for over forty years. They are made of high grade pheolic material and designed with long skirt for full insulating protection. They are weatherproof . . . vibration proof . . . resist pull-out-and are available in four standard sizes. Knurled design makes them easy to use. Order from your supplier along with your tape requirements.

ALL "4" Available At Your Electrical Wholesalers

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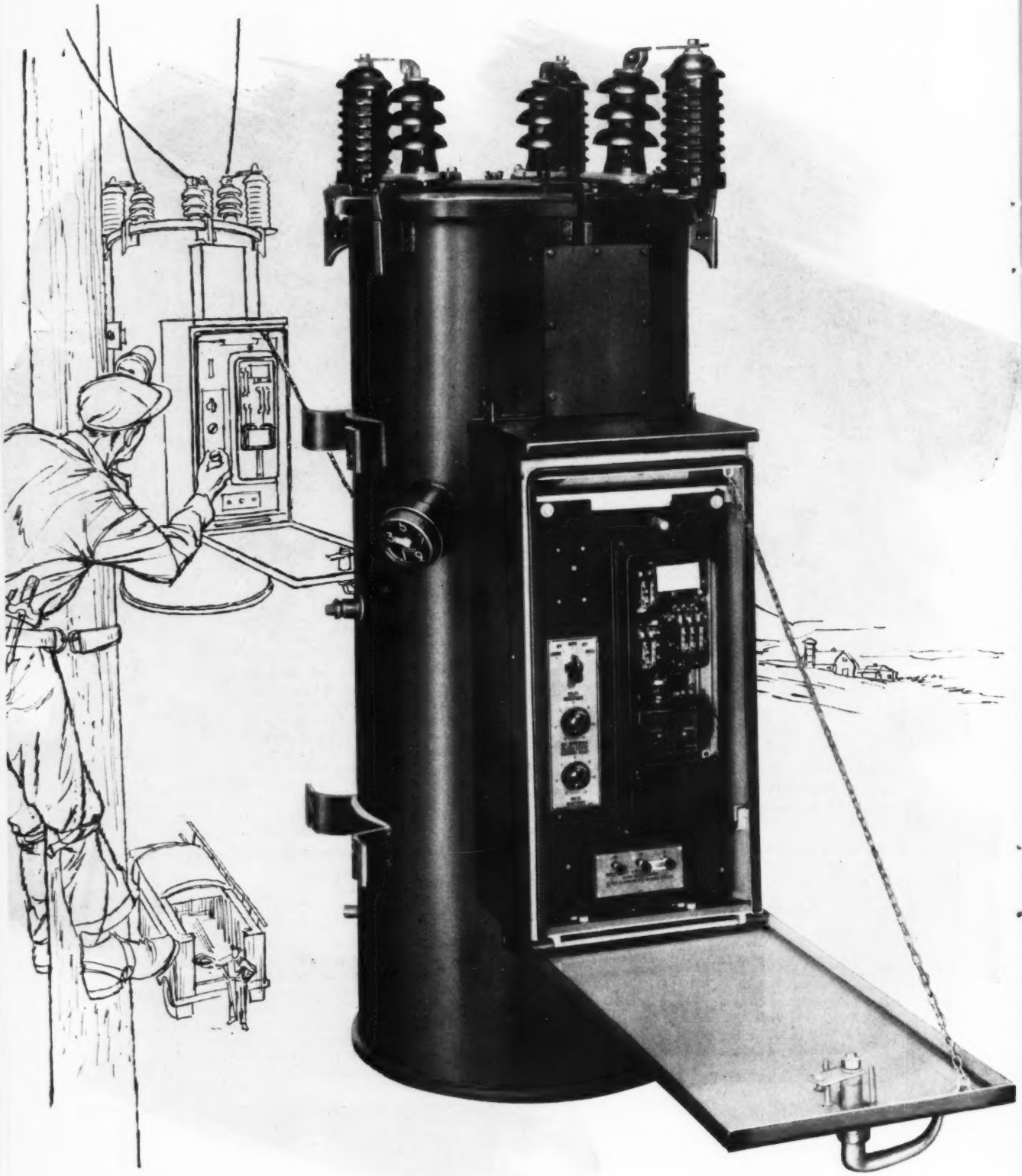


This simple 16-step regulator design lets you correct voltage at "rock bottom" operating cost!

The Westinghouse URL-16 Step Voltage Regulator is basically simple in design. It employs fewer moving parts . . . requires fewer operations to maintain accurate regulation—a fact suggesting unusually low operating cost. Here are a few "specifics" that contribute to this saving:

- ***Only sixteen 1¼% steps*** mean fewer operations . . . less wear occasioned by unit operation.
- ***Direct Geneva drive mechanism*** eliminates intermediate indirect drive devices which may require maintenance.
- ***Fewer contacts*** permit larger size, greater spacing and increased safety factors for longer, trouble-free life.
- ***Packaged control*** in Flexitest* case can be removed as a unit.
- ***Simplified coil design*** has fewer taps in the series transformer windings.
- ***Built-in surge protection*** by "De-ion®" arresters on each line bushing.
- ***Simple dial adjustments*** for all regulator control settings.
- ***Separate tap changer oil*** for maximum life of transformer core and coils.

*T.M.

These are the features that reduce maintenance time and costs . . . that make the URL-16 the most economical way to gain close regulation . . . satisfied customers . . . increased revenues. J-10390

Get Complete Information

New Booklet B-5841 contains complete information on the URL-16 Regulator. For your copy, contact your Westinghouse representative or write: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

YOU CAN BE SURE . . . IF IT'S

Westinghouse

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

Caverly Depicts the Atom Spectrum

With a "rainbow" in back of him and an atom in front of him Don P. Caverly, director of commercial engineering, Sylvania Electric Products Inc. of New York, author of *A Primer of Electronics,* simplified a highly technical subject for audiences of all kinds during a tour of the West last month. It included electric clubs, IES, AIEE, as well as groups of salesmen, store clerks, decorators and others. The rainbow was a backdrop semicircle representing the various wavelength bands of the spectrum from sound on up through cosmic rays. As he told what was in such bands he demonstrated lamps, tubes or other electronic devices used in such bands, hanging them on the rainbow chart. The atom was an "exploded" or illustrated concept of the electrons, protons and neutrons and their arrangement in space to make an atom.

THE RAINBOW over Don Caverly's shoulder was used to hang many lamps and electron tubes

IES

A change of dates for the Pacific Northwest Regional Conference of Illuminating Engineering Society in Portland has been made. Originally the conference was to have been held at the Multnomah Hotel, April 23-24, but now the conference has been advanced to April 2-3, at the Benson, just a week ahead of the South Pacific Regional Conference in Los Angeles at the Edison Auditorium, April 9-10. So far no announcement of programs at either has been made, except that E. M. Strong, IES president, and two or three other national figures in the lighting field will be speakers. One feature at both conferences will be presentation of local winners of the "My most interesting lighting job" contest being conducted by each of the sections and chapters. The winners will be entered in the national technical conference of IES, which is scheduled for New York City, Sept. 14-17.

A San Diego Chapter is in the making. Carleton Thompson, San Diego Gas & Electric Co. illuminating engineer, and other San Diego members feel they now have sufficient membership to form a chapter.

A joint meeting at Nanaimo, on Vancouver Island, with the newly formed Vancouver Island Chapter, was held by the British Columbia Section of IES on Feb. 25. A. E. Simpson, consulting engineer, and A. A. Jones, Vancouver Lighting Co., presented two papers on fixtures and store and office lighting design.

EMEA

Electrical Maintenance Engineers Assn. of the Columbia Basin, in Portland, heard Otto Neumer of SKF Industries describe ball and roller bearing data and answer numerous questions at its last meeting. About 80 members attended and A. D. Berkshire, president, presided. Other officers of the group, which numbers 200, are Calvin C. Cooper, vice-president; Don M. McGuire, secretary-treasurer; Burton Price, Joseph Taraba, Marvin Prestwood and Harold Ley, directors.

Capacitors for power-factor improvement was the subject at the February meeting of the EMEA of Northern California when the manager of the capacitor division of Cornell-Dubilier Electric Corp. addressed the group, arranged for by George E. Honn Co.

Richard Rogers was elected president of the EMEA of Southern California by the board of directors, following the membership election of three new directors at the last meeting. He succeeds George Larsen, who with Henry Bente and Tom Benson leave the board. Stan Rejda was named first vice-president, Jack Singleton second vice-president and Jack Pyle secretary-treasurer. The directors are J. J. Bechard, Jack C. Cochran, Floyd O. Nelson and the three newly elected men, Mike Boyak, Aubrey LaForce and Jack Singleton. Rogers heads the public policy committee, Rejda the program, Singleton the 1954 electrical show, Pyle the finance, Cochran attendance and publicity, Nelson educational, Bechard fraternal, LaForce technical, Boyak welfare and King Christopher membership.

The electrical Maintenance Conference, to start March 18 with a dinner and evening program, sessions on Thursday, March 19, morning and afternoon and Friday morning, ending with a field trip to Kaiser steel mill, is being signed for in advanced registrations now.

Contractors

Eleven contractor groups throughout the province have recently been amalgamated in the Electrical Contractors' Assn. of British Columbia. The executive council of the body consists of two delegates from each group. R. "Bob" Beaumont, head of the Vancouver Electrical Contractors' Assn., has been elected president of the united provincial group.

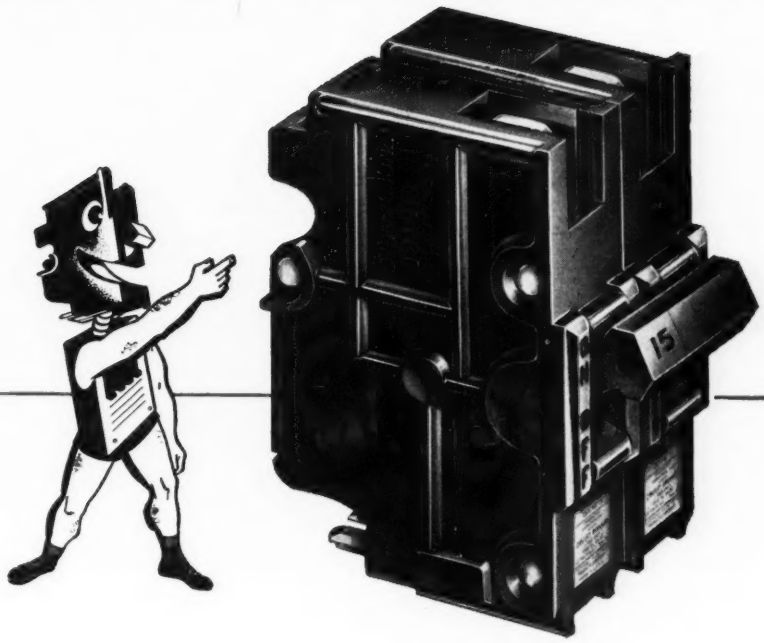
R. C. Ryves, who is president of Victoria Electrical Assn., is first vice-president of the new organization.

The headquarters of the B. C. association are at 570 Dunsmuir St., with Dick Hall as secretary.

Each of the 11 local associations operates as autonomous units so far as local matters and promotions are concerned. S. E. Jarvis acts as secretary for two South Vancouver Island groups, The Victoria Electrical Assn. and the Cowichan Electrical Contractors' Assn. located at Duncan. These two groups comprise about 40 electrical contractor members. The Mid-Island Assn. at Nanaimo has Stan Carlson as secretary.

Only Stab-lok®

has simultaneous trip double pole breakers...



THERE ARE NO HANDLE TIES on Stab-lok double pole breakers. These are 100% simultaneous trip breakers ...it's impossible to trip one breaker without tripping the other. And Stab-lok double pole breakers not only meet the most rigid requirements, they're twice as wide as single pole Stab-loks and instantly interchangeable. Both breakers come in a standard 15 to 50 amp. range.

Stab-lok is the only popular priced breaker whose dependability has been proved on millions of installations. In addition, Stab-lok is today's most modern and flexible circuit protection *system*...a system with a full package of advantages nowhere else obtainable . . . including lowest installed cost. Write for the full Stab-lok story...and order Stab-loks from your distributor.

And only *Stab-lok* has all these extra features

1. Full size; metal where it counts; fewer, more rugged parts.
2. Proved on millions of installations.
3. A complete line of enclosures.
4. Minimum installation costs.
5. Unique 4-way stabs—easiest; safest; automatically locked.
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THE MONTH IN BRIEF

Way Open for Merger Negotiations

Expiration date of Puget Sound Power & Light Co.'s purchase contract with Washington PUDs has been extended from Feb. 27 to July 31. In making the announcement, President Frank McLaughlin said that the way is open for full-scale negotiations on proposed merger of Puget and Washington Water Power Co. (EWEST, February, p 154) and that the July 31 closing date will not be advanced while merger negotiations are on. WWP President Kinsey M. Robinson, who declared himself highly pleased with McLaughlin's statement, reports that his firm has guarantees from banks and bond houses for all necessary financing. PUD financing, on the other hand, has been delayed by legal complications surrounding the deal and the districts have been unable to get a guarantee for the required $107,000,000.

PUD Law's Constitutionality Questioned

Remaining legal barrier to PUD purchase of Puget Power is a suit by Kitsap PUD and C. E. Ferguson, one of its commissioners, seeking a permanent restrainer on grounds that the 1949 state law making the purchase possible is unconstitutional. This action was brought in Kitsap County Superior Court at Port Orchard, Wash. An earlier action brought by Kitsap PUD in Thurston County Superior Court (EWEST, February, p 154) was dismissed on a Kitsap motion, following rulings destroying the basis for the suit. J. W. Bryan Sr., chairman of the Kitsap PUD and foe of the proposed purchase, won his right to continue in office when the county court dismissed a challenging suit, based on a boundary change.

Controversy Continues on Steam Costs

Argument over who should pay abnormal steam power costs during the recent power shortage was still hot in the Northwest. Interior Secretary Douglas McKay wrote his successor as governor of Oregon, Paul L. Patterson, that his department was at work on development of a fair program to ease the burden on private utility customers, who are now footing the bill in surcharges of from 11 to 20%. Administrator Paul J. Raver and other BPA officials were summoned to Washington, D. C., to confer on ways to spread auxiliary high-cost steam generation over both private and public utility customers. Oregon State Representative Monroe Sweetland (also Democratic national committeeman), who has a bill in the house calling for public hearings prior to imposition of any surcharge (EWEST, February, p 158), last month filed a complaint before the state utility commission as a customer of Portland General Electric Co., asking for a complete review of the right of private utilities to levy the surcharge. His bill of particulars went far beyond the surcharge question, calling for a review of PGE profits of the past several years, accusing the power company of inflating its rate base and operating expenses and claiming depreciation beyond intent of the Oregon law. PGE has until March 19 to file its reply.

Pacific Coast to Have Aluminum Rolling Mill

Plans for construction of the first rolling mill on the Pacific Coast for production of aluminum sheets, strips and circular shapes have been announced by Harvey Machine Co. Inc. of Torrance, Calif. The plant will cost about $20,000,000 and probably will be adjacent to the company's present site. The project will be privately financed, according to President Leo M. Harvey.

No Agreement Reached on Boulder Generator

Although appropriations will be requested for N8, last generator that can be accommodated in Boulder Dam power house, disposition of the 82,500 kw was undecided late last month. Representatives of Nevada Colorado Commission, Los Angeles Department of Water & Power and USBR, meeting in Boulder City Feb. 14, were unable to work out a satisfactory arrangement. Nevada, badly in need of power (see p 134), wants at least 70,000 additional kw; says that under the proposal put forth by City of Los Angeles, it would gain only 6,000 kw. Los Angeles officials claim that the city has offered four or five different plans for sharing the capacity, which Nevada has turned down without suggesting a compromise.

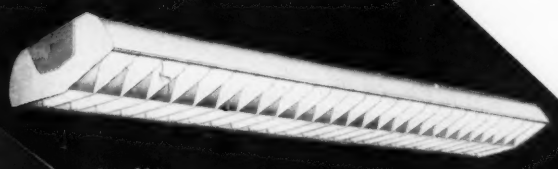
PUD Bills in Washington Legislature

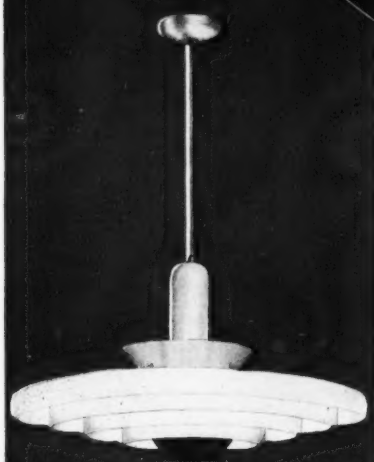
Measures to curb PUD powers were not faring well in the Washington State Legislature. A bill to require districts to call for bids on revenue bonds was sent back to committee by a Senate vote of 25 to 20. A motion to consider a bill restricting right of PUDs to acquire private power facilities by condemnation lost in the house by eight votes. New power bills introduced included one to permit the state, any city or PUD to make agreements with other cities or districts to purchase or construct power facilities (designed to permit construction of a dam at Priest Rapids on the Columbia). Another measure would make possible dissolution of PUDs in Yakima, Lincoln and other counties where steps have not been taken to acquire properties. A third measure would authorize a strengthened state power commission (see p 124).

Pelton Dam Fight Goes to Legislature

In the Oregon legislature, a bill aimed at Portland General Electric's proposed Pelton Dam has been introduced by Senator Robert D. Holmes of Clatsop County. The measure asks Oregon to live up to terms of an interstate agreement reserving all Columbia tributaries below McNary Dam, except the Willamette River, for fish production and banning any river flow barrier more than 25 ft high. Proponents of Pelton Dam were planning to present a bill increasing the hydroelectric commission from three to five members and requiring each of the four congressional districts to be represented, with right of appeal on commission rulings to the circuit courts.

SCHOLASTICALLY CHOSEN





A few fundamentals in teaching have changed but it's still as simple as A B C, your eyes need the proper illumination. SMOOT-HOLMAN still believes in basic fundamentals: GOOD materials + GOOD design and workmanship = the BEST in lighting equipment. The CIRCL-LITE was designed for schools. It is the perfect classroom luminaire, embodying the EARTHQUAKE PROOF feature. Available in two sizes accommodating 300/500 and 750/1000 Watt Silvered bowl lamps. The COLLEGIATE in fluorescent is also outstanding in its class. Smart appearance, low brightness and high efficiency make it ideal for school installations. Available in 2 and 4 lamp 48" 72" 96" slimline lengths. Ask your architect or electrical engineer to SPECIFY and your electrical contractor to INSTALL—the BEST in—lighting—SMOOT-HOLMAN equipment.

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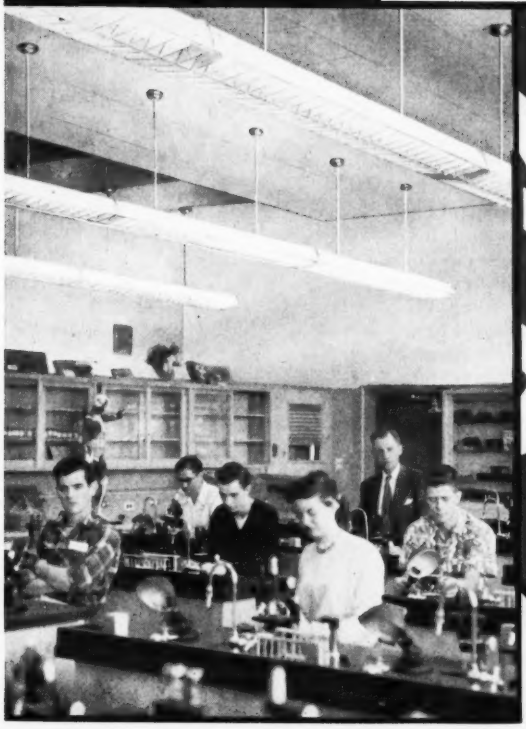
BRANCH OFFICE AND WAREHOUSE SAN FRANCISCO



"What can I do?"

Oil is ruining my cords and cables...

"We inspect cords on the assembly line regularly.

If oil is ruining your cords and cables, switch to Neoprene-jacketed Bronco 60 Certified. Just any "Neoprene" jacket will not do. Be sure your cable jacket is made with a *sufficient quantity* of Neoprene. Be sure the cable you get is Bronco 60 with jacket CERTIFIED to contain not less than 60% Neoprene *by weight*.

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THIS MONTH'S NEWS

FPC Lacked Jurisdiction, Reclamation Bureau Claims

Charges that the Federal Power Commission lacked jurisdiction to issue licenses for power developments on the North Fork of the Kings River because the major portion of the lands had been withdrawn from public entry were made by the Bureau of Reclamation in the opening brief of its suit to set aside FPC's permit order.

The suit, in U. S. District Court of Appeals, 9th Circuit, San Francisco, seeks to upset three FPC orders granted Nov. 10, 1949, which issued permits to Fresno Irrigation District for possible hydroelectric development of Pine Flat Dam and reservoir, and to Pacific Gas and Electric Co. for expansion of its Balch hydro project above Pine Flat on the North Fork and for another hydro projection on the North Fork.

The bureau's brief asserted: (1) FPC lacked authority since Secretary of Interior had withdrawn the lands involved for federal development. According to the Federal Power Act, no agency has a right to license on lands reserved for reclamation. (2) FPC refused to recommend the North Fork developments to Congress for possible federal development and had further failed to wait a specific length of time before granting licenses for developing power at any government dam, as required by the Federal Power Act. (3) FPC did not consider the development of the Kings River under the comprehensive Central Valley Plan and standards of the power act, but assumed that the lands were useful for development of power generation only in granting licenses for the PG and E projects. (4) Under the Flood Control Act of 1944, the right to develop the hydroelectric potentialities of Pine Flat Dam and any dam built by the Corps of Engineers must be disposed of through the Department of Interior.

● FPC has postponed to April 28 its hearing on application of the Big Horn Canyon Irrigation & Power Co., Hardin, Mont., for a preliminary permit covering a hydro project on the Big Horn River in Montana and Wyoming. The hearing was scheduled originally for Feb. 24 in Washington, D. C.

"Your worries are over, partner"

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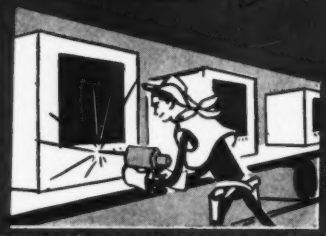

BRONCO 60 Certified keeps production rolling because it is oil-resistant, flame-resistant, abrasion-resistant . . .

EXTRA FLEXIBLE!

Jackets are branded with complete identifying date . . . name, type, size, number of conductors and P116BM, approval number of the U. S. and Pennsylvania Bureaus of Mines.

WESTERN INSULATED WIRE CO.
Los Angeles 58, California

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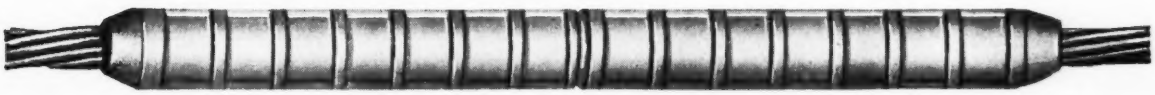
FOR LARGE CONDUCTORS AND HIGH-STRENGTH STRANDS

SPLICING SLEEVES

**Light in weight—Holds full strength of conductor—
High in conductivity**

Completed NICOPRESS Splice on 4/0 Copper Conductor

**Completed NICOPRESS Splice on 3/8" Extra High Strength
Copperweld Strand**



**Completed NICOPRESS Splice on 3/8" Extra High Strength
Galvanized Steel Strand**

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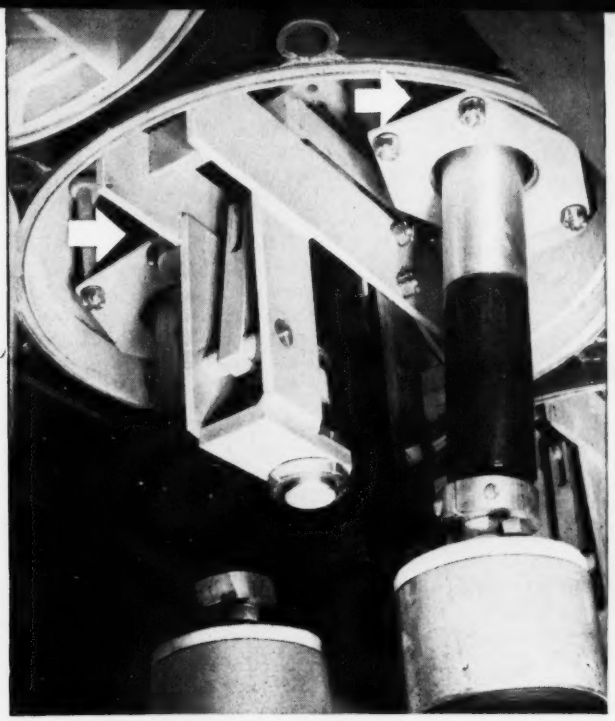
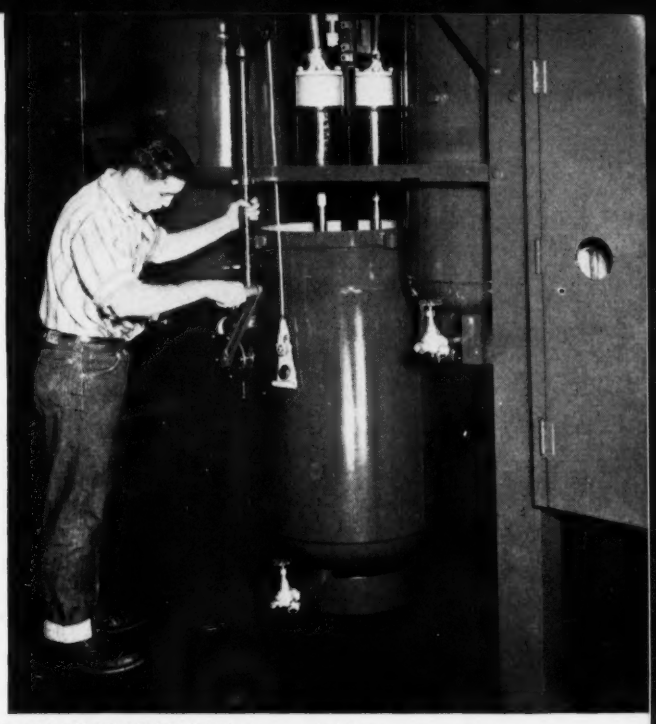
NEW BREAKER, shown here assembled on factory floor, is designed so that all parts are easily accessible for inspection or maintenance. Positive indicating mechanism makes it easy to see breaker position (open or closed) from any angle.



TWO CURRENT TRANSFORMERS provide extra metering when needed. New design provides room for installation of two transformers *on each bushing* as shown.



TANKS MAY BE LOWERED in the field for easy access to bushings and contacts. This makes it unnecessary to drain oil during inspection or maintenance.

New G-E breaker interrupts with shorter arc to cut oil maintenance

New design features improve reliability, simplify maintenance

Improved service reliability and reduced need for inspection and maintenance are the outstanding advantages of the new Type FK-439 and 1200-ampere outdoor power circuit breakers.

New oil-blast interrupters cut oil carbonization by interrupting faults or load currents with short-arc lengths and low-arc energy. Silver-molybdenum surfaces on the interrupter contacts insure minimum erosion. As a result, fewer inspections will be found necessary, and oil maintenance requirements may be substantially reduced.

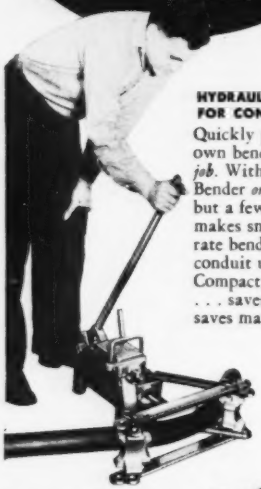
Contributing to greater reliability in service is a new, sturdy oil-filled bushing, Type LC. It is of center-clamp construction, thus eliminating all cemented joints. Lower ends of bushings are given a special coating to reduce the electrostatic deposit of carbon particles. This means even less maintenance. Space is provided for two current transformers on each bushing.

The new Type FK-439 breakers are powered by an improved pneumatic operating mechanism, which employs a simple pneumatic trip-free linkage design, completely eliminating the need for a flying latch. Simplified support framework, float-type oil gauge and more accessible pole-unit linkage are among the many detail improvements. For full information, call your local G-E sales representative or write to General Electric Company, Schenectady 5, N. Y. 872-1

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

CUT COSTS WITH GREENLEE TIMESAVING TOOLS FOR ELECTRICIANS



HYDRAULIC BENDERS FOR CONDUIT, PIPE

Quickly produce your own bends *right on the job*. With a GREENLEE Bender *one man* in but a few minutes makes smooth, accurate bends in pipe and conduit up to 5". Compact, portable . . . saves hours, saves materials.

HAND BENDERS FOR TUBING, PIPE, CONDUIT

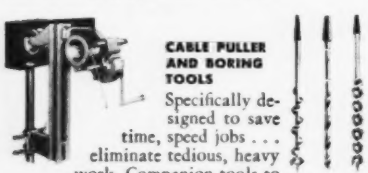
Quickly form small-radius bends without flattening or kinking. Especially designed to make neat bends for sharp corners, nooks and other close quarters. Saves up to 75% in time and materials on many jobs.

KNOCKOUT PUNCHES AND CUTTERS

For fast, easy enlarging of knockouts and cutting of holes in metal boxes, cabinets, panels. Various sizes and models for making openings for conduit sizes from ½" up to 3½". To operate, simply turn with a wrench.

HYDRAULIC KNOCKOUT PUNCH DRIVER

Portable hydraulic unit for driving GREENLEE Knockout Punches. Speeds jobs . . . easily operated. Develops over 11 tons of pressure so that conduit openings are cut in 10-gauge metal with ease.



CABLE PULLER AND BORING TOOLS

Specifically designed to save time, speed jobs . . . eliminate tedious, heavy work. Companion tools to many other GREENLEE timesavers for the electrician.

GREENLEE

Write for new Electrical Tool Folder, Greenlee Tool Co., 1763 Columbia Ave., Rockford, Ill.

STRONGER STATE POWER COMMISSION PROPOSED

Gov. Arthur B. Langlie of Washington has indicated he may seek to "improve the authority" of a state power commission authorized by the 1949 state legislature but never activated.

"I never have been anxious to put the state in the power business," he declared, "but when you get problems which cross county lines, state boundaries and into federal agencies, something must be done."

In the event of an interstate compact to take over the Columbia River dams now operated by the federal government, the state power commission would be Washington's representative, backers of such a compact have suggested. It would have power to construct new generating facilities.

The proposed three-member commission would consist of representatives of private, public and municipal power agencies.

Langlie explained that he had wanted the previous power commission legislation merely for "stand-by purposes" but that new concepts of power responsibilities and new conflicts are arising that "may hamper further advances" unless a strengthened commission is authorized.

His Democratic opponents in the Nov. 4 election criticized him for not activating the commission, in the light of a recurring power shortage.

The proposed new commission would work closely with the policies of the federal administration, Langlie said. The commission authorized by the 1949 legislature was considered as having far-reaching powers to acquire power properties.

Washington PUD Wins Judgment Against City

Clallam County PUD has won a $19,133 judgment against the city of Port Angeles, Wash., which had filed claims totaling $85,520 against the PUD.

The city's contract to purchase power from the PUD specified that, should the PUD be able to buy power at a rate lower than that prevailing at the start of the contract, rates to the city would be lowered "as deemed fair and equitable by both parties."

When the contract was made, the PUD was buying power from Puget Sound Power & Light Co. for resale to the city, its biggest customer. In July 1949 it began buying power from the Bonneville Power Administration at a lower rate but it did not grant a lower rate to the city until the following January.

In March 1952 the city withheld $19,133 from its payment to the PUD, leading to a suit in which the PUD maintained the withheld payment was the city's share of a severance charge paid on the old Puget Power contract.

Superior Judge H. G. Sutton held the city had no right to withhold this payment. He refused to consider the city's claim of alleged overcharges from the PUD, declaring the court was not empowered to conduct a rate hearing.

Districts and Municipals Propose Joint Project

First joint construction project of Washington state PUDs and municipalities may be a $220,000,000 hydroelectric dam across the Columbia River at Priest Rapids, according to representatives of the agencies involved.

The proposed dam would be built by Seattle City Light, Tacoma City Light and the Grant County PUD, cooperating through a state power commission under enabling legislation now under consideration. In an effort to meet objections of the Atomic Energy Commission against a high dam (its destruction in an atomic attack would wipe out the commission's Hanford Works downstream), the public agencies propose a lower dam capable of providing 1,000,000 kw of power.

The Corps of Engineers received authorization from Congress in the Flood Control Act of 1950 for a multipurpose Priest Rapids Dam developing 150 ft of head with a total proposed power output of 1,219,000 kw at an estimated cost of $340,000,000. Congress would have to withdraw this authorization before the Federal Power Commission could grant a requested dam license to the Grant PUD.

The public agencies propose to finance the dam with a bond issue.

● **Clark County PUD** of Vancouver, Wash., expects to call bids soon for construction of a $300,000 headquarters building. The two-story-and-basement structure will be in an area planned for eventual development as a city center. It will be of reinforced concrete construction, with partial brick veneer exterior and a concrete canopy over the front sidewalk. The basement will provide parking space for employees' cars.

For a truly sound investment of lighting dollars, the Smithcraft Director is in a class by itself! Installed in literally thousands of banks, stores, schools, offices and similar locations across the United States, the Director is actually a "lighting element" that provides highest quality illumination through large unobtrusive **area of light** source. (The eight-foot, six-light Director provides more than 24 square feet of light source.) Here is ideal lighting that blends with overhead architecture without imposing on the eye the dominance of conventional fixture design.

More than just another lighting fixture, the Smithcraft Director, through its distinctive appearance and superior lighting qualities, brings many **plus** values wherever it is installed. In banks, insurance companies and public buildings of all kinds, it lends an atmosphere of substance and dignity; in offices it contributes greatly to efficiency; in stores it adds to the general selling appeal of both the store itself and the merchandise it sells. **There is no finer lighting investment.**

The Smithcraft Director is available in sixteen different units — for Bi-Pin and Slimline Lamps — with louver shielding of 35° crosswise, 25° lengthwise or with deluxe louver shielding of 40° crosswise, 35° lengthwise. There is a unit to fit the needs exactly of any installation.

For evidence of the superior lighting qualities of the Smithcraft Director, send now for the new eight-page Director folder incorporating the results of comparative tests conducted by one of the nation's outstanding utilities, a leader in lighting.

Smithcraft
LIGHTING DIVISION
CHELSEA 50, MASSACHUSETTS

MARCUS DRY TYPE transformers

first with Dry Type, Pole Mounted Transformers

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NOW... first with HI-HEAT HI-DIELECTRIC Magnet Wire

Nothing is ever considered so good at Marcus that improvement isn't searched for constantly. Since insulation is the heart and backbone of any transformer, Marcus is proud to announce its use of the first real advancement in Class B insulated magnet wire in 12 years. The combination of Johns-Manville *Quinterra* with DuPont *Mylar* and *Dacron* not only provides exceptional heat resistance but dielectric strength as high as 10 times that of the present industry standard. Failure at such vulnerable points as turn-to-turn and layer-to-layer becomes a virtual impossibility. Moreover, another Marcus first, *Quinglas*, having unusually high physical strength, adds extra protection between layers.

Insulation levels never thought possible or economical with dry type transformers are now available from Marcus, one of the largest manufacturers in the world of dry type transformers exclusively. Capacities from 1 to 3000 KVA, up to 15,000 volts.

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INCREASED POWER RATES ON AGENDA FOR BPA MEET

Increased power rates were to be discussed at a customers' meeting called by the Bonneville Power Administration for March 10 at Seattle, Wash.

William A. Dittmer, deputy administrator for the BPA, will enter into a panel discussion with representatives of three Bonneville customers: Eric Brundage of Seattle City Light; Vivian Jones, Tacoma City Light; and Glenn Smothers, Grant County PUD. Paul J. Raver, Bonneville administrator, also will speak.

The law setting up BPA provides that its rates be reconsidered at five-year intervals. At the end of the current five-year interval, in December 1954, the present basic wholesale rate of $17.50 a kilowatt year is expected to be increased to $21 or $22 a kilowatt year, because of higher construction costs.

Proposed establishment of an interstate regional power agency, to replace Bonneville, also is on the program for the meeting.

Parallel Circuits To Connect Sacramento MUD Substations

Station A and City substation of the Sacramento Municipal Utility District are to be connected by two parallel circuits, each 8,800 ft in length, of 115-kv Okonite "Oilostatic" cable. Each circuit will have a capacity of 75,000 kva. Order for the cable was placed last month.

The underground system, to be installed in 1954, will be of the "Oilostatic" type operating under 200 psi pressure. Conductors will be 250,000 cir mil with 435-mil wall paper. These will be installed in 5 9/16-in. od pipe. Cable, pipe, terminals, accessories and supervision will all be furnished by Okonite.

Subsidiary Merged With Telluride Power Co.

Big Springs Power Co. has been merged with the Telluride Power Co. of Richfield, Utah, according to Paul P. Ashworth, an officer of both companies. Big Springs Power serves the area in and around Moroni and Fountain Green. Its outstanding securities were acquired by Telluride about 25 years ago and it has been operated essentially as a division. The merger will result in economies and simplify over-all operations, Ashworth said.

PROSPERITY IN THE USA: How Deeply in Debt Are We?

How prosperous *are* the people of the United States? Previous messages in this special series have answered this question in part by recording the progress—relatively slow progress—we have made in increasing both the income and the wealth per person in the USA.

This fourth and concluding piece of the special series deals with the extent to which our prosperity should be discounted because it has been accompanied by an increasing volume of debt. Many correspondents have suggested to us that an individual or a nation can temporarily increase prosperity by borrowing, but in so doing lives on both borrowed goods and borrowed time. Our purpose here is solely to throw light on the question of whether or not we are now in that unenviable position.

On January 1, 1953, the total debt of the United States government and of its citizens was $627 billion, as shown in the table below. On its face, a debt of this magnitude, which represents about $3,900 of debt for each person, suggests that we are heavily debt-ridden.

TOTAL DEBT – PUBLIC AND PRIVATE

Federal government debt	$267 billion
State and local debt	30 "
Private debt	
Corporations	195 "
Individuals	135 "
	$627 billion

The burden of our debts, however, does not depend simply on their size. It depends in much more decisive degree on our capacity to carry the load successfully. This capacity, in turn, is partly a matter of attitude, and attitudes defy objective measurement. A community that gets very jittery about its debts has less capacity to carry its burden successfully than one that does not. But the accurate measurement of jitters, present or prospective, still remains to be mastered.

Capacity to Carry the Debt Load

Nonetheless, it is possible to throw some light on our capacity to carry the debt burden by studying key economic elements that can be measured with some degree of accuracy. The following paragraphs indicate how some of these key economic elements stand.

Compared with our national income, the total volume of our debts, public and private, is still well below the level of 1929, when it proved to be too big for the good of the country. Our total debt is now 113% greater than the national income whereas in 1929 it was 146% greater.

There are several other cheering facts about our debts. One is a sharp decline in interest rates which makes the cost of carrying our debts relatively much less than it was in 1929. It took 8% of our total national income to carry our debts in 1929; it takes only about 5% of the income today.

More Cheering Facts

We also have much more ready cash now than in 1929. Today individuals and corporations hold a total of $269 billion in cash or its equivalent which is almost twice as much as the portion of private short-term debt (about $140 billion) that is subject to sudden demand for payment.

Many students of the subject cite the relatively low cost of carrying our debts and the large volume of cash on hand, and reach the comfortable conclusion that our debt burden is nothing to worry about. In further support of this view they emphasize the fact that no important part of our debt is owed abroad. Hence, they reason there is not the danger, so conspicuous in Britain since the end of World War II, that our economy will be upset by the necessity of making heavy debt payments to other countries.

Some Dangers of Present Debt

However, the nature of our debts presents dangers that it would be foolish to ignore. This is true of both the debt of $267 billion owed by the federal government to its citizens and the $330 billion in private debts owed by some citizens and corporations to others.

Public debt can be a dangerous kind of debt because government has the power to print money or to create its equivalent by expanding bank credit. Of the $215 billion that the federal government borrowed during World War II, over $90 billion was borrowed from banks. This was the largest single contributor to the inflation of prices that since the war has robbed the dollar of about half of its purchasing power, and thereby robbed the buyers of government bonds of about half the purchasing power these bonds were supposed to represent.

If, as is quite possible, a new emergency should again require the federal government to borrow heavily while its debt remains so high, it is doubtful that the public would be avid to buy its bonds. Hence, the government might again be forced to resort to the inflationary process of relying on bank credit.

Private debts can be dangerous if the people take on new debts more rapidly than is justified by the growth of business or by their ability to repay. Last year bank loans were increased by the imposing sum of about $6½ billion, which represents an increase of about 11% in total loans outstanding. This is almost twice as much as the increase in the volume of business over the same period. Installment credit for consumers increased by $3 billion last year, again an increase in debt about twice as great as the increase in business volume in the fields where the credit was used. It is also the fastest rate of such growth in our history.

Constructive Use of Credit

So long as the expansion of credit does no more than keep pace with expansion in the volume of business, the expansion is constructive. Also, when credit is expanded to acquire resources and equipment that will enlarge the volume of business a little later, that use is clearly constructive. But when private credit expansion begins to run ahead of business growth, it is time for us to be heads up. Such credit expansion courts price inflation. It also creates a forced draft under business so that, if credit is cut off, there may be a painful drop.

To give a summary answer to the question: *Is the level of debt in the United States a danger to our prosperity?* — the answer seems to be, "Not at the moment." We owe nothing abroad. The interest burden on present debt is relatively small, and we appear to have the resources to handle the short-term debt. Yet both the total amount of debt and the recent rapid increase in total private debt, especially the latter, are enough to signal for caution. We need restraint on the part of business and consumers to avoid expanding private borrowing at an excessive rate. The federal debt needs to be reduced and put in more manageable form. If these things are done, we can proceed to build a sound prosperity.

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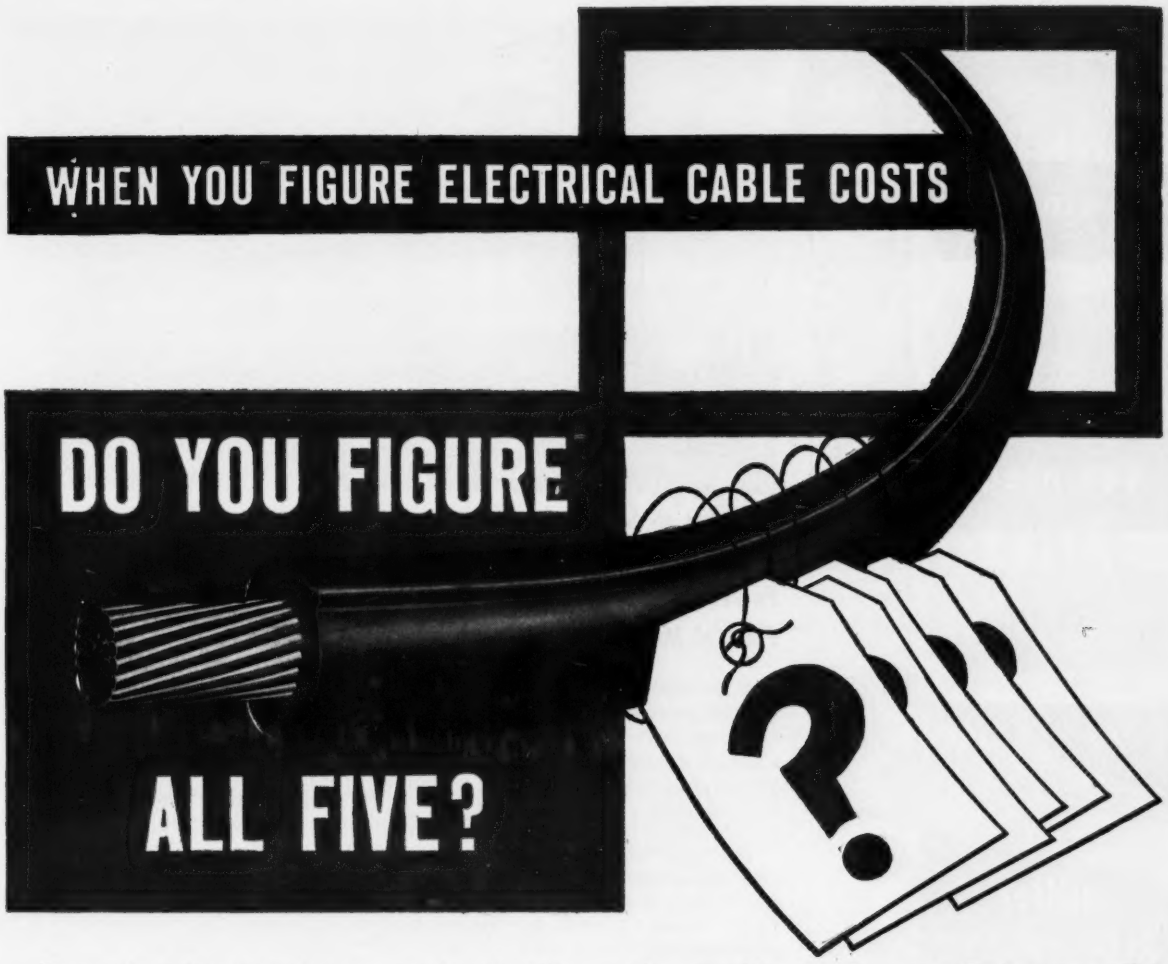

All too often electrical cables are purchased solely on the basis of initial cost. Actually, of course, this is only one of five factors to consider . . . and no true cost comparison can be made until the four "hidden" costs are figured.

Here are the four "hidden" costs which often upset your overall budget, particularly when you're trying to "economize":

- **installation costs**
- **maintenance costs**
- **costs of power shutdowns when a cable fails**
- **costs of replacing a cable which has failed prematurely.**

Okonite cables are the most effective means for combating these costs. A wide range of Okonite cable designs assures you of the most economical installation for any type of operating condition. And for savings throughout the life of the cable, Okonite always uses the premium materials and exclusive processing techniques which deliver unfailing electrical service year in and year out.

We can't condense millions of man-hours of cable research, field engineering and manufacturing experience into a short description of Okonite cables. But your Okonite representative can show you in black and white why the best cables — Okonite cables — really carry the lowest overall cost. The Okonite Company, Passaic, N. J.

The best cable is your best policy

OKONITE SINCE 1878 *insulated wires and cables*

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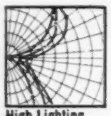

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Modern Design

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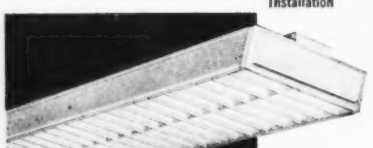
Simplified Installation



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CORRECT LIGHTING is one of the most vital factors in the making of sales—it puts customers at their ease—enables them to see merchandise at its best—speeds IMPULSE buying. The new Miller Burlington—a distinct advance in store lighting—provides CORRECT store lighting of high efficiency without glare. It provides it at L. O. C. (low overall cost)—through engineering features that make for easier, quicker installation, and materially reduce cost of maintenance, making it more economical over the years. You get more Value for your lighting dollars.

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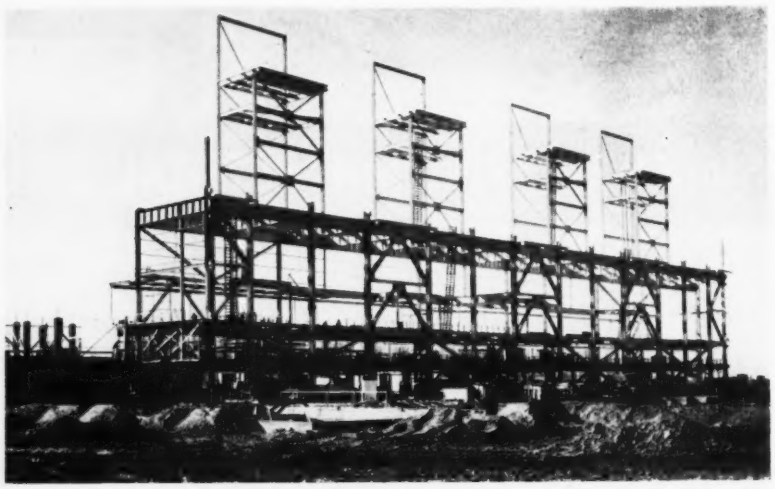
E. J. Imhof, P.O. Box 832, Sherman Oaks, Calif.
H. D. Lang, 6904 Grandview, Arvada, Colorado
R. C. English, 3814 N.E. Wasco St., Portland, Ore.
S. Babcock, 342 Franklin St., San Francisco, Calif.



STEEL RISES for the four-unit 600,000-kw semioutdoor Pittsburg steam plant of PG and E

Power Company Plans Steam Plant at Morro Bay

A $44,000,000, 300,000-kw steam-electric plant will be built by Pacific Gas and Electric Co. at Morro Bay, Calif. Two 150,000-kw generators, first unit of which will be in operation by 1955, will supply the power. Construction will begin this summer.

The plant will be located on a 140-acre site situated at the north end of Morro Bay 12 miles northwest of San Luis Obispo. It will be the sixth steam-electric plant added to the PG and E power system since the end of World War II, and will serve 46 northern and central California counties.

At peak capacity the plant's boilers will consume 12,000 bbl of fuel oil daily, and its cooling system will require 283,500,000 gal of sea water per day.

Chief Joseph Dam Will Be On Line Ahead of Schedule

Chief Joseph Dam on the upper Columbia River not only will be producing power earlier than had been anticipated, but will cost less, the Corps of Engineers has reported.

The first three 64,000-kw units now are scheduled to go into operation Sept. 1, 1955, three months earlier than the original schedule, according to Col. N. A. Matthias, district engineer at Seattle. Sixteen generators are to be installed by the end of 1958. Ultimate installation of 27 units, with a total rating of 1,728,000 kw, would make the plant second in size to Grand Coulee among the world's power plants.

Estimated cost of the project has been reduced $12,500,000 to $193,-250,000, Colonel Matthias reported.

Bids Called on Equipment For Northwest Projects

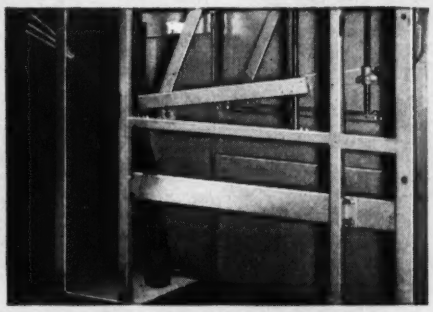
Bids have been called for installing power house equipment in one large Pacific Northwest power project and for the furnishing of equipment for two others.

The Tacoma, Wash., board of contracts and awards will open bids March 16 for furnishing a 20,000-kw turbogenerator for a $2,000,000 expansion of the city's No. 2 steam plant.

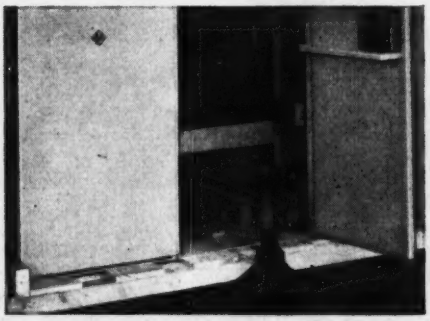
The Corps of Engineers will open bids April 8 at Seattle, Wash., on main control boards for Chief Joseph Dam and on May 20 for installation of power house equipment in Albeni Falls Dam.

The Chief Joseph contract calls for one main control switchboard, one load control switchboard, one graphic instrument switchboard, two generator switchboards, eight flow meters and waterflow recorders, a status board, accessories and spare parts. Delivery of the switchboards is required by Jan. 1, 1955.

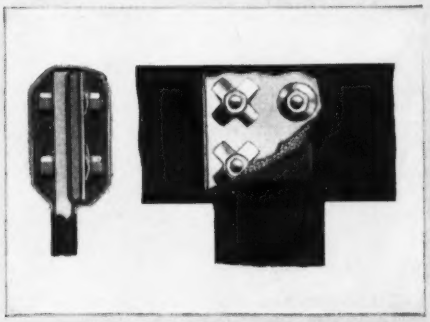
The Albeni Falls contract calls for installing the government-furnished nonembedded parts of three 19,600-hp hydraulic turbines and governors, embedded parts for three 14,200-kw generators, 15-ton gantry crane, three 15,778-kva transformers and associated electrical equipment, and other items. Completion of the work is required within 730 days.



1 **PLACING** switchgear over floor cable is done without lifting cubicles because A-C engineers designed the cubicle so that it simply slides into place.



2 **MOVING** is an easy job even if there's no crane or overhead space. Installation-wise A-C engineers built in provision for jacking all indoor switchgear units.



3 **JOINING** buses need no longer be a long, time-consuming job. Joint is bolted; then, no-corona tape is placed over bolt heads and nuts. Next, a molded Neoprene boot is slipped over the joint and taped in place. No fuss, no muss, no liquid compounds to worry about.

METAL-CLAD Switchgear

4 REASONS Why It's EASY TO INSTALL

EACH of the accompanying pictures shows one way in which Allis-Chalmers switchgear simplifies installation. These and other carefully engineered details cut installation time and cost. For more information about this economy-minded switchgear, call your nearby A-C representative, or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

4 **INSPECTING** contacts and arc chute during and after installation is only a three minute job with latest Allis-Chalmers circuit breaker. Only one nut to take off and all barriers can be lifted right out.

ALLIS-CHALMERS

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A-3950

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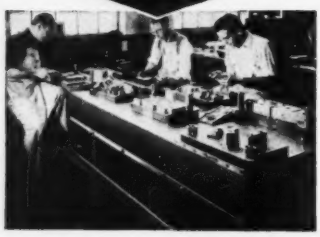
Is the FASTER, EASIER, CHEAPER way to provide multiple convenience outlets!



PLUGMOLD makes work benches more efficient!

This easy-to-install multi-outlet system gives you outlets right at the spot where they're needed — Duplex or NEMA grounded outlets every 30 inches in a continuous run. Closer spacings available if needed; also available in 3-foot and 6-foot factory-wired sections.

PLUGMOLD 2000 eliminates the hazards of a tangle of extension cords — dangerous to workers and to the work! With a PLUGMOLD outlet right at the point of use, you can use shorter cords for electrical tools.

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Makers of
PLUGMOLD – multi-outlet systems
WIREMOLD – electrical raceways
PANCAKE – overfloor raceways

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WESTERN COMPANIES WIN MANAGEMENT AWARDS

Two Western power companies were winners in the Management Excellence awards contest conducted by the American Institute of Management, New York. Pacific Gas and Electric Co. was a third-time winner this year and Southern California Edison was one of ten utilities to secure the certificate for the first time.

Twenty-three public utility firms in the power and light field were among the 330 companies in the United States and Canada to receive the designation. Methods of 3,000 leading concerns were studied by the institute before the awards were made. To qualify, a company must be given 7,500 points out of a possible 10,000. These credits are assigned for excellence in ten areas of management—economic function, corporation structure, health of earnings growth, fairness to stockholders, research and development, directorate analysis, fiscal policies, production efficiency, sales vigor and executive evaluation.

OUTSTANDING AD of the week was the designation given this HECO advertisement by Corporate Intelligence Inc. of New York choosing from among the more than 100 utility entries

Legislature Recognizes 100 Years of Service

By unanimous action, the California Legislature adopted a resolution congratulating the Pacific Gas and Electric Co. on its one hundredth anniversary. A copy of the resolution, with California's great seal, was forwarded to President James Black. The resolution commended the company for being a "pioneer on the road to progress, helping in no small measure to raise the State of California to the pinnacle of greatness which the state has achieved among the states of the Union."

Seattle Amends Ordinance; Will Grant Pay Raises

In a move that it hopes will settle a long-pending wage dispute with unions representing City Light employees, the Seattle city council has amended the 1953 salary ordinance to give additional pay raises to some workers.

Linemen, who were paid $19.60 a day last year and have been receiving $20.29 since Jan. 1, will get $20.36 under the new schedule. Workers who have reached the maximum pay grade for their classifications will receive a monthly increase of $15, one year earlier than under the former schedule, while those who have not reached the top grade will receive $10.

The new schedule follows recommendations by the Seattle Central Labor Council to the Joint Crafts Council of City Light employees.

● **A limited membership Engineers' Club** in Los Angeles will begin operation about April 15. Headquarters in the Biltmore Hotel will include a dining room, cocktail room and facilities for entertaining. Membership will be limited to members of the Founder Societies, ASME, ASCE, AIChE, AIEE, AIME, and other registered engineers. Applications are being accepted by the club committees within each of the five societies. Other interested engineers may secure information from I. W. Chasteen, Union Oil Co., 617 West 7th St., Los Angeles 17.

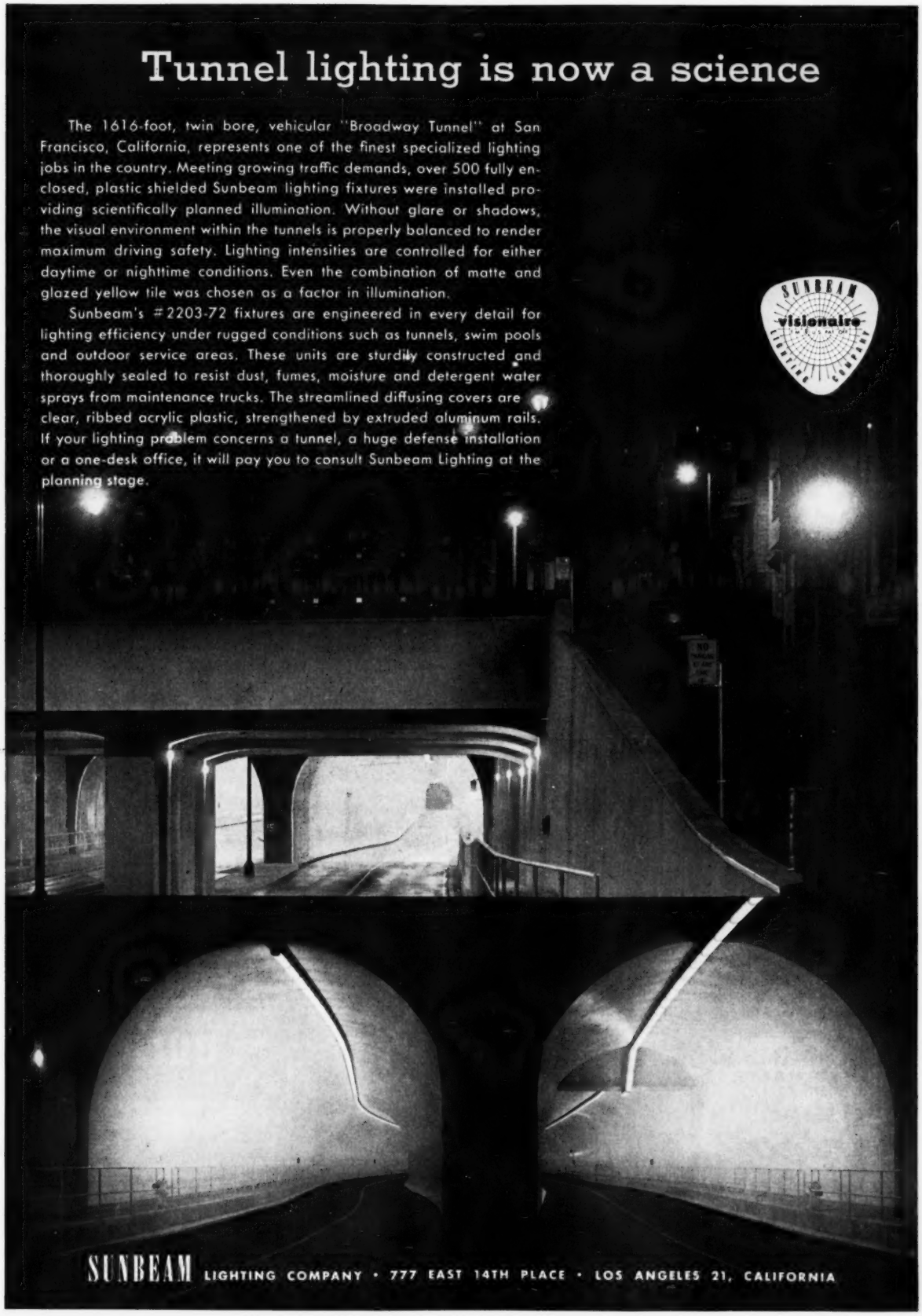
● **The second annual** meeting of the American Power Conference will be held at the Sherman Hotel in Chicago March 25-27. Westerners on the program include S. E. Schultz, BPA chief engineer, speaking on high-voltage power transmission in the Pacific Northwest, and E. Robert de Luccia, vice-president, Pacific Power & Light Co., whose subject will be, "Are Federal Power Practices Sound National Policy?" The conference is sponsored by the Illinois Institute of Technology in cooperation with universities and national engineering societies.

Tunnel lighting is now a science

The 1616-foot, twin bore, vehicular "Broadway Tunnel" at San Francisco, California, represents one of the finest specialized lighting jobs in the country. Meeting growing traffic demands, over 500 fully enclosed, plastic shielded Sunbeam lighting fixtures were installed providing scientifically planned illumination. Without glare or shadows, the visual environment within the tunnels is properly balanced to render maximum driving safety. Lighting intensities are controlled for either daytime or nighttime conditions. Even the combination of matte and glazed yellow tile was chosen as a factor in illumination.

Sunbeam's #2203-72 fixtures are engineered in every detail for lighting efficiency under rugged conditions such as tunnels, swim pools and outdoor service areas. These units are sturdily constructed and thoroughly sealed to resist dust, fumes, moisture and detergent water sprays from maintenance trucks. The streamlined diffusing covers are clear, ribbed acrylic plastic, strengthened by extruded aluminum rails. If your lighting problem concerns a tunnel, a huge defense installation or a one-desk office, it will pay you to consult Sunbeam Lighting at the planning stage.

SUNBEAM visionaire LIGHTING COMPANY



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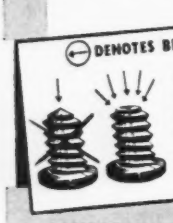
NEW E. M. T. SET SCREW FITTINGS SAVE INSTALLATION TIME ...GIVE LASTING GRIP

These new EFCOR Set Screw Connectors and Couplings make possible amazing labor and material cost savings in non water-tight installations. One turn of set screw locks the E.M.T. firmly into place.

No Special Tools Needed—Installations which are inaccessible with an open end wrench are now quickly, easily accessible with an ordinary screwdriver!

Stripping of Screw Threads is Eliminated—Overlapping of steel in the construction of the body doubles the length of the screw thread.



Efcor Case Hardened Cup Screws lock tubing more securely than conventional pointed screws because they bind a greater surface area of tubing.

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NEVADA NEGOTIATING WITH ARIZONA FOR POWER

To relieve the power shortage in the southern part of the state, Nevada's Colorado River Commission is negotiating with Arizona agencies for firm and off-peak energy. It is believed that up to 926,000,000 kwh of excess energy annually may be available by 1956.

Governor Charles Russell, Nevada CRC chairman, announced following a meeting with Arizona officials Jan. 31 in Henderson, Nev., that an offer had been received from the Salt River Valley Users Assn. to sell the State of Nevada a large quantity of excess power beginning in the fall of this year.

The plan was submitted to the Arizona power authority group for approval and only one serious problem appeared, the legal question of whether the Arizona authority, over whose lines the power would have to be wheeled, has the legal right to transmit power generated in Arizona for sale outside the state.

The power would be sold by Arizona to the State of Nevada backed by long-term contracts financed by Nevada power users. Cost of the power to Nevada was estimated to be about 8.5 mills per kwh at the Boulder Dam switchyard.

Salt River Valley Power Users' representatives said their association would be able to deliver 488,000,000 kwh in 1953; 524,000,000 in 1954; 596,000,000 in 1955; 926,000,000 in 1956, leveling off on that basis in the years following.

Governor Russell said this amount of power would just about take care of the shortage expected in southern Nevada during the next 10 years, both for use at the Basic plant in Henderson and for domestic and industrial consumption in southern Nevada counties where Boulder Dam energy now is being sold.

Power Franchises Asked For Copper Mining Town

Power franchises for the new copper mining town planned at the San Manuel Mine site in Pinal County, Ariz., have been asked by Arizona Public Service Co. The mine and its adjacent community will support a population of about 8,000.

Public Service asked the Arizona Corporation Commission for authority to supply power from its new Saguaro plant being built north of Tucson. Power would be wheeled over Reclamation Bureau lines to a point near Oracle Junction from which the utility would build other lines to the site of the development.

● **Snohomish** County PUD has budgeted $200,000 for this year to start construction of a $1,000,000 building program at Everett, Wash. The program will include shops, line headquarters, warehouse, to be built first at a cost of $350,000, and a $650,000 office building scheduled to start next year. All will be built on a five-acre site near the central business district.

● **Beaver Valley Electric** Assn. in Utah, financed about ten years ago by REA, has sold its system to the Telluride Power Co. Reasons for the sale, according to reports, were unprofitable business and unsatisfactory service.

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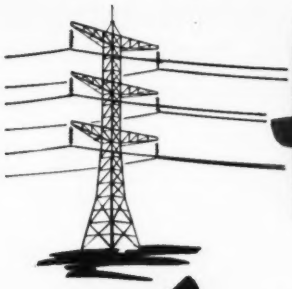

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FUNDS FOR RAIN MAKING RESEARCH DEBATED

A proposal to abolish entirely funds for research into rain making by the State of California produced fireworks at a California legislative committee hearing in Sacramento, Feb. 3.

The legislature's auditor recommended the research be discontinued because studies to date with $22,744 have been inconclusive.

But the state division of water resources, which has been investigating the effects of cloud seeding argued that additional funds are necessary, not only to evaluate past rain making activities but possibly to conduct experiments of its own.

The division requested authorization to conduct controlled experiments in cloud seeding. It would select an area 100 miles square and carefully instrument it with both recording and nonrecording rain gages. At every storm opportunity the decision would be made, on a random basis, whether to seed. The rainfall catches would be documented for all storms and a comparison made between seeded and unseeded storms.

The location of the tests would be such that commercial cloud seeders are not upwind, the precipitation occurs substantially as rain, the area is accessible, floods are not a regular occurrence, the agricultural economy is such that early or late rains would not be damaging and the local inhabitants would be favorably disposed to such a program.

The water resources board had requested $60,000 for the study. R. R. Reynolds, senior hydraulic engineer for the division of water resources, insisted the state should have more data on rain-making possibilities.

Legislature Asked to Help Legalize Firm Ownership

Action of the current Washington State Legislature is being sought to legalize ownership of an electrical equipment manufacturing plant at Tacoma by the Swiss Oerlikon Engineering Co.

Although a law now on the books prevents any alien from owning land in the state, Oerlikon has a Tacoma plant in which it has an investment of $2,000,000. To make the company legal, the legislature is being asked to pass a resolution calling for a vote at the next general election on amending the antialien land statute to allow land ownership by any foreign-financed corporation that wants to establish a factory.

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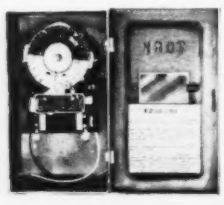

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NOTES ON THE TRADE

● **Formation** of the Walter Weyman Co. as northern California manufacturer's representative in fields of power, transmission and materials handling was announced by **Walter E. Weyman,** president. Among firms now represented is the Crocker-Wheeler Co. Weyman formerly was with Benbow Mfg. Co. at Redwood City, Calif., as sales engineer, and Moffett Engineering, Albany, as sales manager. Offices of the new firm are at 1465 4th St., Berkeley 10, Calif.

● **Ground** has been broken at Portland for a new General Electric service shop and warehouse. The building will occupy more than 44,000 sq ft and will cost about $500,000, according to **J. R. Murphy,** district apparatus manager. **J. F. Gogins** is Portland manager of the apparatus division.

● **The Sky is the Roof,** a color sound film featuring the newly developed Allis-Chalmers weather-protected motor for outdoor service, is available through the manufacturer's district offices. The film runs about 12 minutes.

● **West-Win** Mfg. Co. Inc. is the new name for Erickson Inc. of El Monte, Calif., manufacturer of electrical fittings, according to **Loring E. Winters,** new president of the company. **Earl Westerfield,** formerly sole owner and now vice-president, will concentrate on design and production of new products.

Elwood Wiles Co., makers of lighting fixtures, traffic signs, etc., has moved to 012 S. W. Montgomery St., Portland 1, Ore.

RAY H. McMILLEN shows the registered trade symbol which will now identify the catalogs, literature and even brief cases of the newly reorganized McMillen-Stanley Sales Corp., a co-partnership of Ray McMillen and Lynne Stanley. Other corporation officers are Ralph R. Papka, secretary; Mrs. Cora L. Johnston, assistant secretary. McMillen is president; Stanley vice-president and treasurer. The firm represents Pryne-Rittenhouse Sales Corp.; Clifton Conduit Co.; Rattan Mfg. Co.; Afco-Lite Corp.; Tomic Sales & Engineering Co.; Victor Specialties; MiroFlector Co. Inc.; Star Fuse Co. Catalogs seen will soon be distributed to the trade

FRED S. FENTON Jr. transfers to Jack C. West, for seven years Northwest district sales manager, the reins as Western division sales manager of Easy Washing Machine Corp., on retiring after 26 years with Easy. W. R. Wilson, Seattle district sales manager for Nason Paint Co., takes over West's post in the Northwest. Fenton has not yet announced his plans for the future

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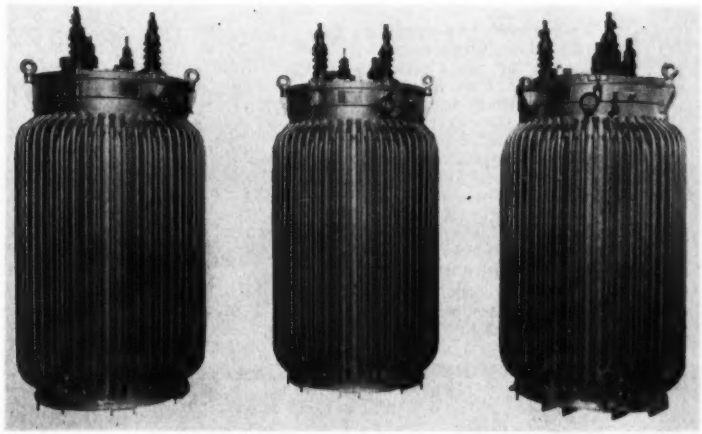

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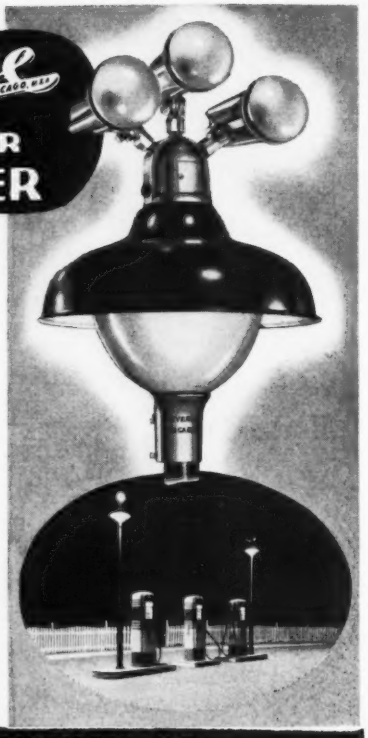

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NEWS ABOUT PEOPLE

● **Two Pacific Coast** men were named national officers of the AIEE at its recent winter meeting in New York. **D. I. Cone,** transmission and protection engineer for Pacific Telephone & Telegraph Co., San Francisco, was nominated for a four-year term as director. **George C. Tenney,** vice-president of McGraw-Hill Publishing Co., San Francisco, was named for a two-year term as vice-president to represent District 8, which includes California, Nevada and Arizona. The AIEE summer general meeting will be held in San Francisco in June 1954.

● **Paul B. McKee,** president of Pacific Power & Light Co., is a member of Mutual Security Administrator Harold Stassen's team evaluating U. S. aid programs for NATO allies. He has been assigned to Belgium-The Netherlands and will head the mission to the low countries. He left Portland last month and will make his report to Stassen in March.

● **Appointment** of **Dan Miller** as district manager of the Northwest territory for Square D Co. was announced last month by J. H. Pengilly, vice-president and general manager of the Western division. Miller was graduated from CIT in 1935 and joined Square D 17 years ago. He has served the company in Los Angeles, San Francisco and in the Northwest, in production engineering and as industrial control sales specialist. Since 1950 he has been in charge of industrial control sales, with headquarters in Los Angeles. He will be succeeded in that post by **Richard L. Russell,** former Los Angeles territory sales supervisor. New district engineer for the Pacific Northwest will be **E. R. Walton.**

● **Roy R. Peck** was made Roller-Smith sales engineer with the Electric Materials Co. in Los Angeles. Formerly with the Line & Material Co. as apparatus engineer, he has been in the West since 1946. Previously he spent 13 years with the Kansas City Power & Light Co.

● **Carl C. Torrell,** for five years headquarters application engineer for Pacific Electric Mfg. Corp., San Francisco, has been transferred to the office of Pierce G. Fredericks, sales representative, in New York.

● **Fred O. McMillan,** head of the electrical engineering department at Oregon State College, has been named "Engineer of the Year" by the Professional Engineers of Oregon. The citation was in recognition of his professional contributions, his inspirational guidance of youth and the national attention his service as president of the AIEE in 1952 had brought to the work of the Oregon organization. It was made at the annual PEO banquet in Portland.

● **J. W. Howard** has been made manager of lamp sales for General Electric in the San Diego and Imperial County areas. He will be headquartered in the Federal Savings and Loan Bldg. He formerly was district engineer for the division.

● **Claude D. Herbert,** employee of Westinghouse Electric Corp. for 47 years, retired recently. He joined the San Francisco sales department in 1906 and served in numerous capacities in both the industrial and electric utility sales divisions.

Deaths

● **Guy W. Faller,** former president and board chairman of Public Service Co. of Colorado, died Feb. 12 at his home in Mesa, Ariz. Mr. Faller was born in 1878 in Baraboo, Wis., joined the Cities Service organization in 1902. First employed by the Madison Gas & Electric Co., he was transferred to Denver in 1904 and to Amarillo, Tex., in 1913. He returned to Denver in 1923 and remained there except for about three years with the H. L. Doherty securities department. He served as vice-president and general manager of Public Service of Colorado, and was made president and general manager in 1940; chairman of the board in 1943. He retired in June 1951.

● **Louis K. Doutrick,** retired vice-president of Arizona Public Service Co., died recently in Phoenix following a long illness. He was actively connected with the utility industry for 31 years before his retirement in September 1952. He remained a member of the Public Service board of directors until his death. He was born in 1892 at Cadotte, Wis., was with Westinghouse and Florida Power & Light Co. before he joined the Central Arizona Light & Power Co. in 1928. Starting as chief engineer, he was made vice-president in 1939. He was elected to the board of directors in 1948 and became vice-president and general consultant in 1950.

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PROFILES

Farrar Maher Davis

Miller

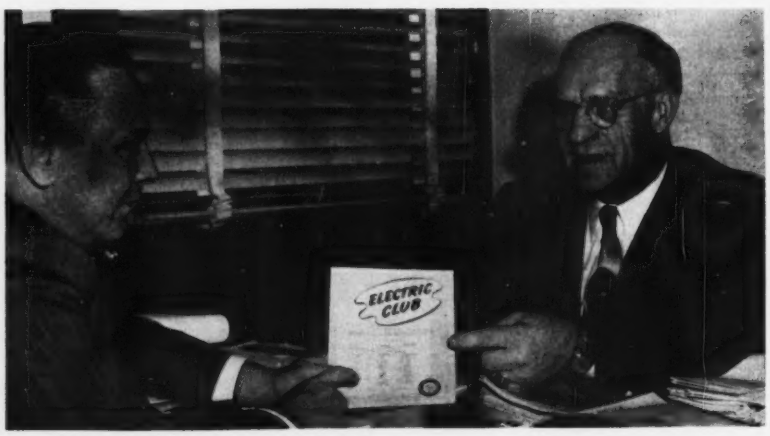
JOAN DAVIS, star of G-E Appliance Co.'s TV show, broke the first ground for the organization's new office and warehouse building in Los Angeles. Leaning on their shovels are **E. H. FARRAR**, Central Manufacturing District sales manager, and **S. B. MAHER**, southern California manager for the G-E Appliance Co.

DAN MILLER has been appointed Northwest district manager for Square D Co., which will open a new Seattle plant in April (see p 140)

HARRY P. GOUGH, former vice-president of G-E Credit Corp., has been transferred to San Francisco as head of the recently established Western region, G-E Major Appliance Divivsion

C. J. BUNCE, manager, electrical contractors division, Bureau of Home Appliances, was re-elected secretary and **MARVIN MUSGRAVE**, employment supervisor, San Diego G&E, was made president of San Diego Electric Club

Gough



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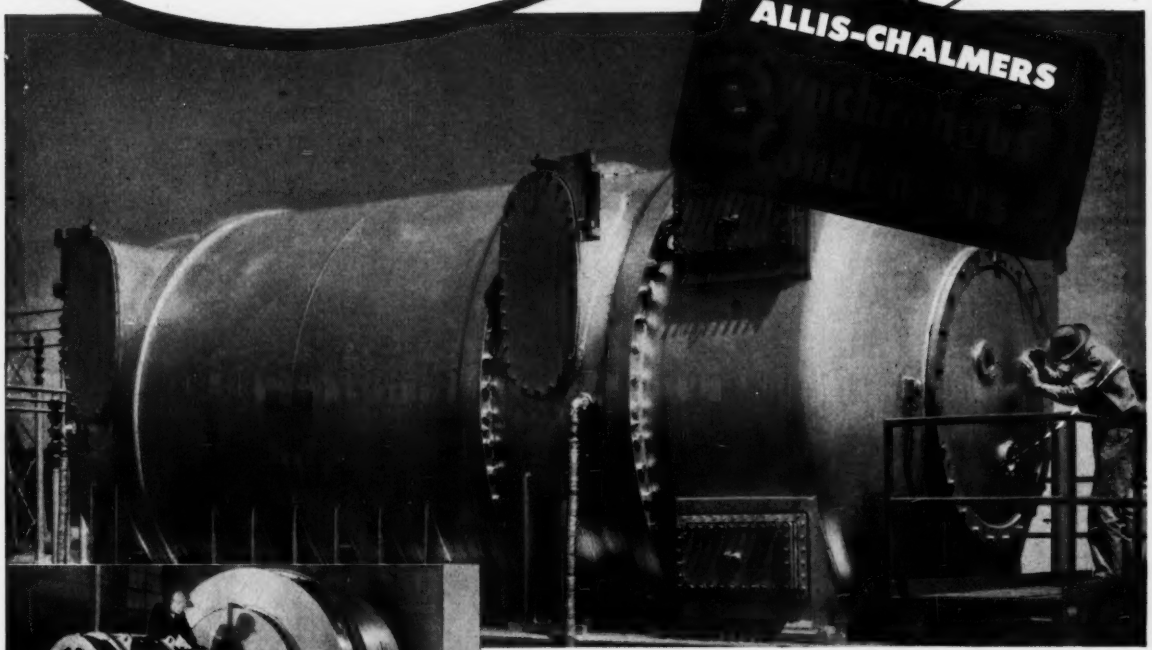

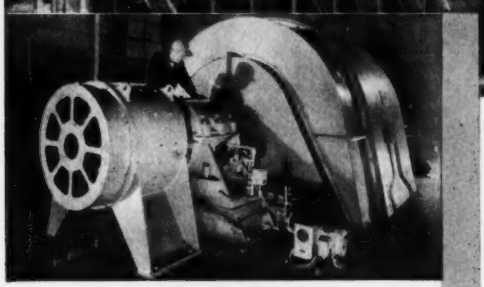

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Besides minimizing losses, hydrogen cooling results in a design suited to outdoor operation. Air-cooled units can also be built for outdoor use, and for industrial power-factor-correction applications.

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But condensers can do more than just cut conductor requirements. They also provide voltage regulation on a wholesale scale, and furnish rotating inertia for improved system stability.

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A-3960

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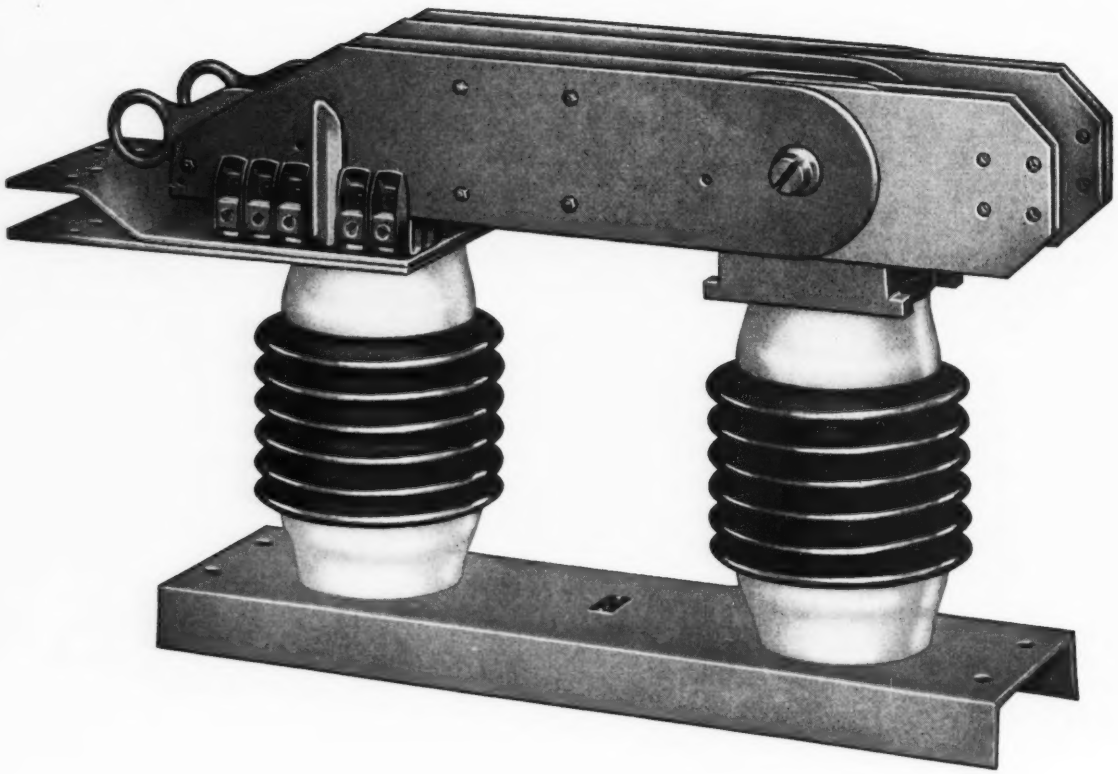

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See Bulletin 20-A

SILVER TO SILVER CONTACTS

How can P. G. and E. bills for the same amount of gas and electricity be

Lower today than in 1938!

It's true . . . 100 kilowatt-hours of electricity and 100 therms of gas in a typical California city cost 44¢ *less* today than in 1938. Here's why: Since early 1938, P. G. and E. home rates were *cut* sharply in five separate years: in April, 1938, in 1939, 1940, 1943 and 1946. This brought rates way down.

Post-war rate increases have been so moderate that the typical household gas-electric bill is still *below* the 1938 level. Gas and electricity are real bargains at a time when practically everything else you buy has doubled in price!

Let P. G. and E.'s bargain utilities do more of your work, bring you more comfort and convenience. Any way you look at it . . .

Gas and electricity are cheap in California

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

2AX-53

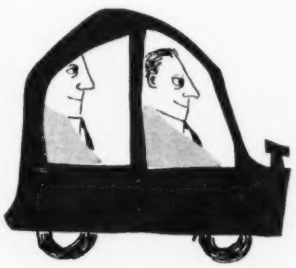
we're going your way!

"You take the high road and I'll take the low road" doesn't apply in the Pacific Coast Electrical Association. There's only one road to a better future for the entire electric industry, and the whole P.C.E.A. crowd is headed that way!

Why not come along with us? You'll be in good company. And what's more, you'll be in a "do something" organization which is working to make the road easier to travel.

If you aren't a P.C.E.A. member, we urge you to join. If you are a member, we urge you to take an active part in our active program for 1953.

Full information is available without cost or obligation, through either of our offices.



PACIFIC COAST ELECTRICAL ASSOCIATION

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